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ABSTRACT

This report provides details of a study conducted to learn how handwriting was being taught in Ontario (Canada) schools. The report is presented in two parts. Part one contains an introduction to the study, a review of the literature on handwriting, analysis of curriculum guidelines used by Ontario school boards, an examination of the methods of handwriting instruction used in Ontario classrooms, attitudes toward handwriting instruction, analysis of student handwriting samples, and a summary/conclusion. Part two is an annotated bibliography on the history of handwriting, its developmental aspects, methods of instruction, handwriting style, the evaluation of handwriting quality, lateralization of the brain, "handedness," teaching handwriting to learning disabled children, general resources on handwriting instruction, and miscellaneous handwriting topics. Appendixes are also included, providing samples of materials used in the study, interview schedules, and a classroom observation checklist. (RL)

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HANDWRITING

I. Instruction in Handwriting in Ontario Schools
II. Handwriting: An Annotated Bibliography

STEPHEN B. LAWTON, Principal Investigator
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Abstract

This study was conducted in order to assess current modes of instruction and levels of accomplishment in handwriting in Ontario schools. Research techniques used included non-participant observations of classroom instruction at all elementary grade levels; interviews with teachers, principals, consultants, and students; and content analysis of handwriting guidelines provided by various school boards throughout the province.

With regard to handwriting methodologies currently being used in Ontario, it was found that very little variation existed among the schools visited. An analysis of data collected from the public and separate schools and school boards surveyed indicated that Ontario's teachers do not adhere to widely differing or individual theories of handwriting instruction, indeed that few adhere to any unified theory in this subject area. Nor did any school employ an extensive commercially prepared program based on developmental theories of psycho-motor and visuospatial refinement. Instead, it was found that teachers typically created their own programs of instruction, or employed handwriting guidelines provided by school boards. Few guidelines discussed the theoretical basis for the activities suggested, although it appeared that the activities had been gleaned from the handwriting literature, or from experimentation on the part of individual classroom teachers.

With regard to the quality of handwriting produced by the students surveyed, a key ingredient appeared to be the emphasis placed on handwriting by the principal and teachers in any given school. When students are required to produce neat and legible handwriting, they usually comply; when they are not required to do so, they tend not to place a high priority on the skill and the quality of handwriting is therefore not

high. Of particular importance may be the continued emphasis placed on handwriting in the upper elementary grades.

For the most part, it appears that the quality of handwriting in the many samples collected from both left- and right-handed students is of acceptable quality, with few serious problems of illegibility in terms of letter form, slant, spacing, alignment, or letter joining. While there are considerable differences in handwriting quality among students, the differences seem to be due more to variation among the students themselves than to variation among programs of instruction.

Preface and Acknowledgments

Penmanship....

An archaic word summoning visions of letters carefully written in fine copperpoint script with delicate loops and flourishes; of an era now past, an era of craftmanship.

But, handwriting is still taught. It is a skill necessary for school and work. Two forms are taught: block letter printing, and a cursive script. They constitute perhaps the most complex single skill taught in school, one in which perceptual, verbal and motor abilities come simultaneously into play.

To learn how handwriting is being taught today in Ontario schools, a study was commissioned. This report describes the findings of that study, and is divided into two parts, each having a different purpose.

Part I is a description of current practices in Ontario's classrooms and should be of interest to teachers, coordinators, superintendents of programs, and parents. It includes many ideas and suggestions which can be put to immediate use, and refers the reader to other sources such as the collection of handwriting materials, collected for this study, which is now available at the OISE Library.

Part II is quite different. It is an extensive annotated bibliography which delves deeply into historical, psychological, and visuospatial literature on handwriting. Others wishing to pursue the study of handwriting, perhaps initiating their own studies, will find this bibliography of value.

Both parts provide sound evidence that fine penmanship is not an outmoded ideal, but one to which a significant number of teachers and researchers continue to be committed.

Acknowledgments

The eight school boards, fifteen schools, scores of teachers and hundreds of children who participated in this study deserve special recognition for their cooperation. Unfortunately, the anonymity needed for this type of study prevents our naming them. Nevertheless, we appreciated the welcome and assistance they provided us, and express our sincere thanks.

Several other persons played key roles in the study; their names can be given: Andrée Coffman who typed the study and assisted in the administrative work; Martha Schmidt who assisted with the interviews in schools; and Darlene Daughen who collected the school board handwriting guidelines. Our thanks to them, too, for the many hours and fine work they have contributed.

Finally, the roles played by the two authors of this report deserve comment. While the principal investigator was responsible for the research design and project management, the project report and supplementary bibliography are primarily the work of the research officer on the study, Dr. A. Blaine Currie.

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DEFINITIONS OF SPECIAL TERMS USED IN THE STUDY

copying - drawing an alphabet character or other graphic representation on a blank sheet of paper, chalkboard, or newsprint.

cursive - a free and flowing form of handwriting in which all letters of a word are written without lifting pen from paper.

dextral - right-handed.

fine motor skill - a learned motor ability that utilizes small muscles of the hands and arms (e.g., controlled finger and hand movements).

gross motor skill - a learned motor ability that utilizes large muscles of the body (e.g., arms and legs).

italic - a style of handwriting based on Renaissance Italian scrips in which letters are formed with serifs using a snub-nosed fountain pen and in which all letters of a word may not be joined together.

joined manuscript - a vertical form of handwriting in which specially designed forms of manuscript letters are joined with one another to form a transitional script between pure manuscript and pure cursive.

lateralization of the brain - double-hemisphere construction of the brain and the specialized functions associated with each hemisphere.

manuscript - block printing, in which the letters of a word are formed individually, typically using simplified letter forms consisting of straight lines, arcs, and circles.

printscript - see "joined manuscript" above.

psychomotor - pertaining to the capability of an individual to consciously control his/her gross and fine motor activity.

sinistral - left-handed.

tracing - drawing a letter or other graphic representation over an existing symbol. May be done with a pencil, crayon, finger, marker, etc.

visuospatial - pertaining to visual perceptions of objects located in three-dimensional space.

PART I: INSTRUCTION IN HANDWRITING IN ONTARIO SCHOOLS

1 Introduction to the Study

This study, funded by the Ontario Ministry of Education, was designed to evaluate handwriting instruction in Ontario elementary schools. As an initial investigation into this curricular area, its scope was far-reaching and encompassed the following seven points:

1. to search the literature for studies on the development of legible handwriting among children, commensurate with their psycho-motor skills;
2. to provide the basis for a P1J1 support document in the "Curriculum Ideas for Teachers" series;
3. to provide information or assistance in the professional development of teachers;
4. to describe the methodologies principally used in Ontario schools to teach handwriting, including "printing", in the Primary and Junior Divisions;
5. to explain the empirical basis of each methodology;
6. to measure the effectiveness of each method in the development of legible handwriting;
7. to assess the effect of each methodology on the attitude of the student towards learning.

In order to fulfill the requirements described in the preceding seven points, the following steps were undertaken:

1. Curriculum guidelines in English and the Language Arts from a large sample of Ontario school boards (including both public and separate schools) were collected and analyzed as to the theory and practice of handwriting instruction contained therein. A set of criteria were developed for assessing these guidelines in terms of the basic components

of handwriting instruction, including perceptual skills, handedness, evaluation procedures, and so forth;

2. Research related to the components of instruction in handwriting was reviewed, resulting in an annotated bibliography on handwriting included as Part II of this report.

3. Handwriting programs in a sample of elementary schools from public and separate boards were selected and were assessed in terms of:

a) actual classroom practice of instruction in handwriting;

b) the perceived and actual effectiveness of different handwriting instructional procedures;

c) the needs of teachers for curricular materials and other assistance in teaching handwriting, especially those related to the diagnosis of handwriting problems among students, and

d) the principal's and consultants' roles in developing handwriting programs.

4. Student attitude toward printing and writing instruction were assessed in the sample of schools selected in (3) above.

The study is, for the most part, a cross-sectional survey employing content analysis, interviews, and non-participant observations. Content analysis was limited to curriculum guidelines and classroom materials; interviews were conducted with consultants, principals, teachers and students; and observations of handwriting instruction were conducted in classrooms at all elementary grade levels.

The primary product of the study is a description of the current approaches used by Ontario teachers to teach handwriting and of the handwriting that results from this instruction. A formal assessment of the effectiveness of different methodologies did not prove feasible, there being few distinctive "methodologies" used in practice. Nevertheless, the description of current practices does include many creative ideas used by teachers to instruct, to inspire and to assess students; ideas that we hope will be useful to others teaching the art and skill of handwriting.

2 Review of the Literature

Before any investigation into handwriting instruction in Ontario schools could be undertaken, the relevant research literature had to be reviewed so that we might come to a clear understanding of the current state of the art. In this chapter, a general review of the literature is presented, with an attempt to give the reader some basic information on all facets of handwriting instruction and research. A more extensive introduction to specific aspects of the subject can be obtained from the annotated bibliography included as Part II of the report.

History of Handwriting

Man's desire to record information about himself and his environment is evident throughout history, from prehistoric to modern times. Indeed, it could be argued that major advances in science, technology and the arts were all dependent upon mankind's ability to preserve current achievements in graphic form. Only by creating permanent records, was it possible for future generations to build on the existing stock of recorded information, and then in turn record their own contributions to the growing body of knowledge.

The first type of writing produced by man consisted of crude scribblings on cave walls and stone tablets, which later developed into more detailed drawings, referred to as "pictographs" (Diringer, 1968). These pictographs initially described an event through a single picture, but over time, showed an evolutionary development from such still life pictures of animals and humans to a series of action pictures telling stories about events in the life of the creator. The next stage of development occurred when simplified symbols, instead of detailed pictures,

were used to represent objects. The emergence of such "ideographic" writing enabled the writer to add much more detail to his story, since less time was required to create each picture representation (Diringer, 1968).

Because "thing pictures" could not convey abstract ideas, a series of "idea pictures" were also developed. For example, by combining the symbol for "mouth" and "water", one created a graphic representation for the concept "drink". Further advances in written language resulted from the use of "sound pictures" (Ogg, 1961), wherein characters were used to represent syllables in compound words, rather than discrete objects. For example, by combining the symbols for "hot" and "dog" one could create a totally new concept of "hotdog", which has nothing to do with the constituent words, but which nevertheless sounds like the combination of both terms. This particular development in written communication ultimately paved the way for the development of the modern Latin alphabet, which assigns a different letter for every discrete vowel and consonant sound.

According to Havelock (1976), there are three theoretic requirements which must be fulfilled by any writing system in order for it to be classified as a true alphabet: (1) coverage of all the phonemes (i.e., the minimum acoustic constituents) in the language must be exhaustive; (2) the letter shapes must be restricted to a total of between 20 and 30 for easy recall; and (3) individual letter shapes must not be required to represent several sounds; that is, their acoustic identities must be fixed and unchanging. The Greek alphabet, which was later adopted by the Romans, satisfied all three conditions, whereas all previous writing systems failed on one or more of these conditions. The Phoenicians, for example, allocated unique symbols for all discrete consonant sounds, but not for vowels, so that it was left to the reader to decide where a vowel sound was intended in a word and which particular vowel was needed.

Ullman (1969) suggests that the nature of writing materials available throughout history has had an enormous influence on the style of writing that was produced. Chiseling in stone in the earliest days led to the use of straight lines, whereas the movement to pen and ink on papyrus or parchment led to the development of a more flowing circular form. As more and more people in the Roman Empire learned to write, a rapid personal

cursive script with joined letters evolved, in addition to the exacting, laborious formal script used to record permanent text. In time, this informal script had a significant influence on formal script, promoting greater simplicity in letter formation. With the introduction of printing techniques in the fourteenth century greater uniformity of letter forms was made possible, so that by the sixteenth century the Latin alphabet had spread across most of Europe to become the standard printing form in most Western countries.

Recent Developments in Handwriting Instruction

In recent years, it has been said that the quality of students' handwriting in North America has deteriorated somewhat, primarily due to innovations in education which have placed less emphasis on basic writing skills. Enstrom (1965), for example, claims that in the larger schools in the United States handwriting was taught more skillfully between 1900 and 1930 than at any other period in educational history, and attempts to account for this decline since the early decades of the century. Until the 1920's, cursive script was taught exclusively in North American schools without students ever being exposed to manuscript handwriting lessons. In that decade, however, Marjorie Wise introduced the British manuscript style to the United States school system, arguing that the simple forms of manuscript would be easier for young children to master and also aid in the process of learning to read, because of the similarity of its letter forms to printed text.

In Canada, writing programs, such as those developed by H.B. McLean, also advocated this dual manuscript-cursive handwriting system.

As manuscript was being introduced in the 1920's and 30's, many educators were rebelling against the narrowness of the teaching of handwriting in schools, and insisting that an integrated approach (i.e., with reading and spelling) be adopted in order to make the task more meaningful. This new philosophy, in conjunction with the need to drop "fads and frills" during the 1930's depression, caused the elimination of specialization in handwriting instruction by teachers, so that by the early 1940's, few colleges were preparing teachers for handwriting programs in the elementary grades. By mid-century other innovations received the major attention in educational circles, while the "basics" seemed to be crowded into the background. Today, Enstrom suggests that skills in teaching handwriting have been lost

for the most part, resulting in an illegible hand for many students leaving school. Groff (1975) lends an element of support to this view, with his finding that only 50 per cent of U.S. elementary schools had a separate period of handwriting instruction in 1961.

Developmental Aspects of Handwriting

Because the ability to write involves both perceptual and motor elements, it is essential that the child attains an adequate level of maturity in both psycho-motor and visuospatial development before formal handwriting instruction is begun. As early as 1947, Hildreth suggested that learning to write is not a mechanical lower-level reflex response, but a thinking process which entails activity of the cortical nerve areas, in addition to motor coordination of eye, hand, arm and finger muscles. Writing from memory was said to demand the internalization of visual and kinesthetic images of form, not present in the senses, for future recall. Once the discrete letter shapes and complex muscle movements required to form letters and words have been internalized by the individual, an automatic writing response can arise, whereby one is no longer required to think about the writing act itself, but can concentrate solely on the message to be conveyed.

More recently, Furner (1969) has suggested that teachers have overlooked the perceptual aspect of handwriting tasks and have concentrated solely on the motor aspect, through drill and copying exercises. She claims that handwriting instruction should attempt to build accurate perceptions of the procedures involved in letter formation and to begin motor development of the constituent arm, hand, and finger movements prior to actual use of the letter forms, in order to preclude the development of inaccurate perceptions and motor habits. The basic exercises advocated in her program of instruction include guided examination of the letter formational process, verbal descriptions of letter construction, and student self-evaluation of errors with attempts to describe verbally areas for improvement. Results from a study comparing her perceptual program with a traditional motor-oriented program have shown that the overall quality of writing in the experimental group was higher, the speed faster, and the rate of error in letter formation lower. Because of these preliminary findings, it was concluded that the experimental method

was much more effective in developing accurate perceptions of handwriting procedures to serve as a guide to motor development, thereby producing a better quality of handwriting.

Søvik (1975) has made a significant contribution to the literature through his exploration of the psycho-motor aspects of children's handwriting from the perspective of cybernetic feedback theory. According to his model, self-generated body tracking mechanisms operate within an individual to monitor muscle action and to ensure that the desired action is the one which is ultimately carried out by the appropriate muscle group. In this way, feedback information constantly directs muscular movement towards the desired target by comparing the actual motion with the desired motion, and then adjusting errors accordingly. In the case of an experienced writer, a "feedforward control mechanism" is believed to operate. Here, the individual anticipates the desired letter shapes from his mental repertoire and uses this information to direct hand motion in advance of the actual pen movements on the paper. This anticipation of future hand-motion increases the possibility of coordinating expected hand movement, and hence promotes a rapid writing style, in much the same manner as was suggested by Hildreth above.

Methods of Instruction

Because of differing viewpoints as to how children grow and develop, educators have suggested many different ways of teaching students in the school setting. In the case of handwriting, a variety of techniques have been employed, with some grounded in complex developmental theories and others based solely on traditional teaching methods and informal classroom experimentation. Although many educators are convinced of the power of their handwriting programs to produce the highest quality writing that suffers the least deterioration over time, it is not apparent that any single foolproof method exists which consistently produces top quality results. Teachers are therefore advised to use those approaches which they find most successful, and which are compatible with the remainder of the school program.

Barbe and Lucas (1974) and Bauman and Horton (1973) both claim that if handwriting instruction is to be successful, then it must be made

relevant to the student's own experience. They suggest that practice does not necessarily make perfect, especially when patterns requiring endless repetition of a single letter, out of context, are required and result in acute boredom with the handwriting task. Only when the child is enjoying him/herself will he/she excel, in any curricular activity.

Croutch (1969) claims that basic difficulties in handwriting often arise from improper body posture and paper positioning. For right-handed children, he suggests that the bottom left corner of the paper should point to the navel, while for left-handed children, the lower right corner should point to the navel. The non-dominant hand should rest on the bottom half of the paper to ensure an unobstructed visual field, and good body balance which promotes muscle relaxation for a flowing hand. The elbow and forearm should rest on the writing surface, and the feet should be kept flat on the floor. The body should be slightly turned to the non-dominant hand side and the eye kept approximately 16 inches from the paper. Ideally, the writing surface should be inclined towards the writer at an angle of 20 degrees from the horizontal.

According to studies conducted by Foerster (1972), activities requiring children to trace alphabet letters do more to establish bad writing habits than to improve writing skills. Apparently, when a child is required to trace over a dotted outline (as in faded tracing), his/her attention becomes centered on covering the line, rather than considering correct starting and stopping points and the proper sequence of strokes. Since it is impossible for teachers to supervise all students completing the tracing exercises, Foerster recommends that this practice be completely abandoned. In a complementary study, Hirsch and Niedermeyer (1973) examined the effect of faded tracing and copying exercises on the handwriting performance of Kindergarten children, and found that differences between the copying and faded tracing groups were indeed significant, favoring the students who engaged in copying exercises.

Current handwriting practices usually result in the child's learning manuscript or print script in Grades 1 and 2, and then switching to a flowing or cursive script in Grade 3. Although we tend to take this transition from writing to printing for granted, there are many educators who question the wisdom of this practice and advocate the exclusive use

of either a manuscript, cursive, or italic script. Early (1973), for example, recommends that cursive writing be taught in the early elementary grades, maintaining that a switch from manuscript to cursive may be especially harmful to children with learning disabilities. He also believes that cursive script entails a natural rhythm which promotes an automatic writing response. When the writing act becomes automatic, as suggested by the works of Hildreth and Sovik above, the child is not burdened with the necessity of attending cognitively to the production of appropriate hand and arm movements. Instead, the cognitive energy can be totally directed to the message that the child wishes to convey. Manuscript writing is not seen to entail such rhythmic movements, and supposedly will not promote the desired automatic writing response as easily as does cursive.

Plattor and Woestehoff (1971), on the other hand, question the need for students to ever learn cursive, and advocate the use of manuscript as the sole writing style throughout the student's educational career. They suggest that if the goals of handwriting are speed and legibility, then both of these goals can be achieved as easily with manuscript as with cursive, while not requiring the child to learn two different methods of handwriting.

Hildreth (1963) also objects to the changeover from manuscript to cursive writing in the elementary grades and refers to it as a wasteful and unnecessary use of the child's and teacher's time. She further claims that there is no natural transition from manuscript to cursive script because the letter strokes are distinctly different in each case. However by modifying the manuscript style through slant and the joining of letters, it is possible to create a closely related italic script that builds on the basic manuscript form and leads to a legible flowing adult writing style.

Enstrom (1969b) takes a somewhat different position on this issue by suggesting that the existing dual system of handwriting is necessary for children because both manuscript and cursive writing styles serve different purposes for the developing child and mature adult. The simple lines of manuscript are said to be more easily manipulated by the younger student, but nevertheless constitute an inferior writing mode because they are slower to form than those of cursive, are more tiring for finger muscles, and

cause words to look disjointed. Because of this, Enstrom advocates that manuscript be viewed only as a precursor to a more complex and rapid adult cursive script.

Wilson (1969) disagrees that there is no natural transition from manuscript to cursive, and suggests that both writing styles can be designed so that they have a comparable kinesthetic movement for lower case letters and similarly-formed upper case letters. The author suggests that hand and arm movements for the formation of both manuscript and cursive letters can be essentially the same, with the only major difference being that in manuscript, part of the movement takes place above the paper, while in cursive, the total movement is made on the paper.

A Canadian study by Crawford and Brenner (1972) attempted to resolve the manuscript-cursive debate by comparing the effects of manuscript and cursive writing styles in terms of reading and writing speed, detection of spelling errors, and reading comprehension. One hundred and twenty-four Grade 5 students in two North York, Ontario schools were randomly assigned to either a cursive or manuscript group, where exercises in the appropriate handwriting style were given. Analysis of the means and standard deviations of tests measuring spelling errors, reading and writing speed, and the level of reading comprehension showed no significant differences between the two groups in any of these areas.

Several researchers have attempted to determine what factors are associated with the most legible writing style. Anderson (1969), for example, found that in Grades 4, 5 and 6, girls were generally better writers than boys; girls had a less slanted style than boys; and more legible writing was correlated with larger writing size and with a more uniform slant. Horton (1969), in an analysis of 1000 sixth-grade students, found that right-handed girls produced the most legible cursive writing style, while left-handed boys produced the most illegible samples. However, the quality of all students' handwriting was judged to be unacceptable insofar as the right-handed girls produced 25% of their letters illegibly while the left handed boys produced almost 50% of their letters in an illegible manner.

Other educators have attempted to determine what effect handwriting quality has on student essay grades, but have generated some contradictory

results. Both Briggs (1970) and Markham (1976) found that good handwriting quality had a significant positive influence on the teachers' markings, while Marshall (1972) found no significant differences in the essays his sample of teachers graded.

Lateralization of the Brain and Its Relation to Handedness

Recent research in the area of brain lateralization suggests that lateral dominance exists for such functions as language ability, handedness, musical talent, neurospatial ability, attention span and emotional outlook. A summary of research findings in this area, completed by Galaburda et al. (1978) indicates that: (1) brains without a particular asymmetry are more common in left-handed than in right-handed individuals; (2) left-handed persons are more likely than right-handed persons to show reverse asymmetry, although the extent of the asymmetry is less marked; (3) asymmetry in some left-handed individuals is in the same direction as that of right-handed individuals, but it is also less striking; (4) the region which is larger on one side of the brain varies from being only slightly larger to several times larger; (5) asymmetries appear to be inborn, since they are present in the foetus; and (6) there appear to be sex differences in the distribution and extent of the asymmetries. Such asymmetries are said to determine lateral dominance, with the larger hemispheres associated with greater specialization of all functions controlled by that hemisphere.

Levy and Levy (1978) report on several recent studies which show that right hemisphere functions of the brain develop earlier in boys, while left hemisphere functions develop earlier in girls. Such sex differences were found not only in right-handed children with language functions specialized to the left hemisphere and visuospatial functions to the right, but also in a group of left-handed children where the pattern of lateralization was usually reversed. It was concluded that hemispheric development as a function of sex is independent of the specialization of the two hemispheres, and that male and female differences could not be attributed to socio-cultural factors encouraging different abilities in boys and girls. Supporting evidence for these findings has also been provided by research conducted by Goleman (1978) and Witelson (1976), although many unanswered questions still remain in this particular area.

Several tests of cerebral lateralization were employed by Levy & Reid (1976) on 72 subjects classified according to sex, handedness and hand orientation during writing. They discovered that the direction of cerebral lateralization could be indexed from a subject's handedness and hand posture during writing. Left-handed individuals writing in a "hooked" hand position had the linguistically specialized hemisphere on the side opposite to the dominant hand and the visuospatially specialized hemisphere on the same side. In those individuals with a normal writing position below the line, the reverse was true. This suggests that sinistral students who write with a hook hand may do so, not because of habit, but because of brain organization, although much more research is needed in this area before any conclusive statement can be made.

Handwriting Instruction for Left-Handed Students

According to an extensive study conducted in the United States by Enstrom (1962), 11.1% of all students were left-handed, with an average rate of 12.5% for boys and 9.7% for girls. Because there are such large numbers of sinistral students in our schools and because the mechanics of handwriting are somewhat different for sinistral than for dextral writers, it is not surprising to find that appropriate adjustments in handwriting programs have been suggested for sinistral students. Cole (1939), for example, has suggested that difficulties arise for the left-handed writer because the direction of the script across the page from left to right is the natural outward direction for the dextral writer, but contrary to that of the sinistral writer. In order for the left-handed individual to enjoy the advantages of the right-handed individual, the position of the paper, the slant of the writing, and its direction should all be reversed. Because he/she cannot write as comfortably from left to right as he/she could from right to left, Cole suggested that the sinistral student must adopt an awkward hand posture in order to see what he/she is writing and to prevent the smearing of the pencil or ink.

Enstrom (1962) examined the writing mode of 1103 left-handed students in Grades 5 through 8, and uncovered 15 different handwriting techniques, which he classified into two main groups: (1) those who wrote below the line and (2) those who wrote in a hook hand position above the line. By rating these 15 different techniques on the basis of

quality, speed, the ability to produce smear-free papers, and healthful body posture considerations, Enstrom concluded that the six techniques classified under group 1 (below the line) were superior to the nine techniques classified under group 2 (hook hand position), and suggested that the former technique be taught to left-handed students in the beginning stages of writing. However, as was indicated above, the study by Levy and Reid suggests that "above" and "below" the line writing in left-handed individuals is related to hemispheric specialization in the brain, thereby calling into question Enstrom's recommendations.

Foerster (1975) is critical of the lack of attention that has been given to handwriting instruction for the left-handed child and suggests that left-handed teachers construct such programs for sinistral children. If the classroom teacher is dextral, then it is suggested that she/he team-teach with sinistral teacher or aide, in order that proper posture, arm and hand movement and paper-positioning techniques be employed. Neufeld (1976) for example, suggests that left-handed writers make circles clockwise instead of counter-clockwise, that they slant their writing to the left and that the paper position be opposite to that of a right-handed child.

Handwriting Programs for Children with Learning Disabilities

Children with learning disabilities related to visual, motor, and tactile functioning, frequently experience problems in letter form discrimination, and consequently have difficulty writing in a legible and flowing manner. According to Harrison (1968), a child must have five interrelated perceptual abilities in order to write. They are as follows: (1) visual perception, or the capacity to perceive objects, pictures, parts of a whole, and to discriminate; (2) visuospatial relationships, or the ability to perceive positions in space; (3) visuomotor ability, or the capacity to manipulate spatial relationships in order to construct what has been perceived; (4) eye-hand coordination, or the ability to mechanically reproduce what has been perceived; and (5) recall, or the ability to remember complex details necessary for the production of what has been perceived. Where one or more of these skills are lacking, handwriting problems are expected to arise.

Several researchers have found that a form of joined manuscript or cursive script is more easily manipulated by perceptually disabled children, because

words are perceived as units and are created in basically one continuous motion. Joseph and Mullins (1970), for example, suggest that cursive script may be easier for such children because of its connective lines which clearly indicate the order, position and grouping of letters, and because of the slant which indicates the left-right direction of words. However, it is also suggested that because cursive is dissimilar to printed text, it can cause confusion when reading print. As a result the authors advocate the use of an italic type script which has the flowing and directional advantages of cursive, while retaining the basic letter shapes of print script.

Several individuals have attempted to use behavior modification reinforcement strategies on specific aspects of the handwriting act for children with learning disabilities and have reported a great deal of success. Glynn, Wotherspoon and Harbridge (1976) found that at the end of a 120-day program, wherein token points and social reinforcement were issued by the teacher for improvements in copying, transcribing, and generating words and sentences, all nine children, who at the beginning of the study were performing only copying and transcribing tasks, were producing complex sentences. Samples of the students' work further showed that written sentences had progressed from simple repetitive statements to more complex statements elaborating on a continuous theme. A similar technique was used on children with severe perceptual-motor disorders in a study conducted by Lahey, Busemeyer, O'Hara and Betts (1977). They found that after the introduction of reinforcement and corrective feedback, the number of correct copying responses increased, suggesting that even handwriting problems resulting from severe disorders of this sort can be effectively remediated using direct instructional methods and positive reinforcement strategies.

Carter and Synolds (1974) suggest that many of the difficulties brain-damaged children have with handwriting arise from trying too hard and using too much energy in the process. Through the use of an audio-taped relaxation program, they found that the program was effective in enhancing the quality of handwriting in the experimental group, which also transferred to non-experimental situations, and which remained stable over time. As a result, they recommend that children with any sort of learning disability be in a relaxed state when any handwriting instruction is undertaken.

Campbell (1973) hypothesized that typewriting, a relatively simple motor task requiring little eye-hand coordination, facilitates early reading instruction in learning-disabled children more than does handwriting, a complex motor task requiring a great deal of eye-hand coordination. Fifty students were evenly divided (on the basis of chronological age and IQ) into two groups: one that completed all written work with a typewriter and another which used handwriting. Improvements in reading vocabulary and reading comprehension before and after the experiment were measured through the use of the Gates-MacGintie instrument, with the gains in raw score analyzed by t-tests. It was found that the typewriter group obtained a mean gain in reading vocabulary of 8.36 raw score points and the handwriting group a gain of 4.06 points. Because the differences were statistically significant, it was concluded that the use of typewriters facilitated the acquisition of reading vocabulary skills more than did handwriting.

Conclusion

The research articles reviewed in this chapter present some very useful information for teachers, consultants and other individuals engaged in handwriting instruction and research. They indicate that in order to successfully teach handwriting skills, attention must be paid to the child's level of perceptual, motor, and visuospatial development, his/her hand preference, paper positioning and body posture considerations, the type of script which is utilized (e.g., manuscript versus cursive), and the method by which handwriting models are presented by the teacher and then practised by the students. Although many of the research findings contained in this chapter have produced contradictory results, they nevertheless point to areas that deserve our attention when we wish to create worthwhile handwriting programs.

3 Analysis of Curriculum Guidelines

Having completed a review of the current handwriting literature in the last chapter, we are now prepared to examine Ontario school board curriculum guidelines for handwriting instruction, considering many of the research findings that have been described above. We will begin with some background information on the guidelines themselves, and then proceed to discuss the nature of the handwriting programs advocated by the school boards, the methods of instruction considered, the evaluation procedures utilized, and finally any special provisions for sinistral students, and those having learning disabilities.

Background Information

A request for handwriting guidelines was originally sent to 124 Ontario school boards, resulting in a total of 63 submissions, or a response rate of 51 per cent. It was our preference to work with those boards that showed an interest in the project, and we feel confident that the response received is more than adequate for the purposes of this study.

Not all boards had recent guidelines to send to us. Many sent none at all, while others forwarded those developed by predecessor boards, schools within their boards, or indicated that they followed practices outlined in various published books or commercial curriculum series. Of the 47 public boards of education that responded, 28 (or 60 per cent) sent guidelines; of the 16 separate school boards responding, six (or 38 per cent) sent guidelines. Overall, 34 (54 per cent) of the 63 boards provided some type of handwriting guidelines for use in this study. It was clear from the content of the letters received that the other boards

did not have official guidelines which were in current use. Several responses indicated that the board's staff were knowledgeable in this area and did not need supplementary materials. Most, however, indicated that they would be interested in the findings of the project.

The handwriting guidelines that were received were remarkably similar in terms of objectives, methods of instruction, evaluation procedures and so forth. There were two, however, which could be called truly unique: one advocating the exclusive use of cursive script from Kindergarten onwards, and another using a perceptual-development theory, based on the work of Beatrice Furner (see Chapter Two).

For the most part, the guidelines suggested that the aims of handwriting instruction are to teach students to write in a legible manner, to write with a flowing style that promotes a reasonable amount of speed, to write with ease, and to understand that handwriting is an important communication tool, to be used in the expression of one's thoughts and ideas. Several of the guidelines, however, stressed the artistic as well as the functional nature of the task, suggesting that handwriting should be viewed as a type of artistic endeavour, requiring attention to proper letter forms, and a flowing and artistic style.

Nature of the Handwriting Programs Contained in School Board Guidelines

Because most educators have adopted a developmental view of children's learning, a visuomotor activity such as handwriting is taught in a sequence of learning tasks involving more and more complex skills on the part of the student. Kindergarten is seen to be a time to develop children's basic motor skills, by involving the students in a series of activities which develop gross and fine muscle control as well as eye-hand coordination. In the guidelines, teachers are encouraged to observe individual children at play early in the Kindergarten program in order to determine their degrees of motor control and visual ability. This assessment will supposedly enable the teacher to determine which children are ready to learn to write, and to select the most appropriate learning materials for the group.

Readiness activities for the Kindergarten student usually begin with haphazard scribbling and evolve into the drawing of simple objects, drawing more complex objects, and then imitating, tracing, or reproducing

what the teacher prints on the chalkboard or on paper. Once the child can form circles and horizontal, vertical and diagonal lines, she/he is ready to begin printing, using the "ball and stick" or "continuous stroke" methods outlined below. An example of typical readiness designs are given in Figure 1.

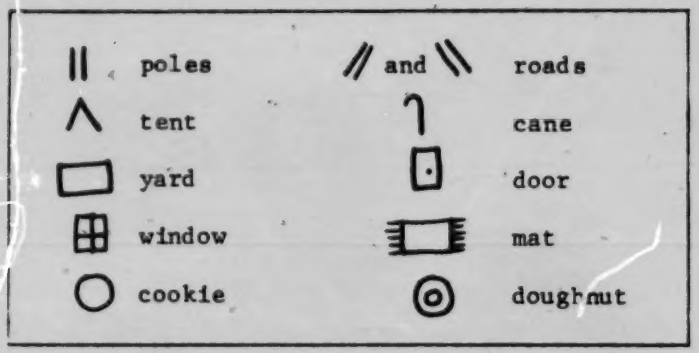

Figure 1: Suggested Readiness Designs

Almost all school board guidelines suggested that manuscript or print script be taught initially in Kindergarten and maintained throughout the first and second grades. Only in the case of one guideline received was the exclusive use of cursive in all grades advocated. In this particular instance, cursive script was seen to be mastered easily by children with learning disabilities, and hence was recommended for widespread usage by all students in the elementary grades. For the most part, however, print script or manuscript is said to be more easily manipulated by young children because of its simple letter forms and their similarity to those found in textbooks and other commercially produced reading material.

Typically, "ball and stick" letters are utilized in Ontario handwriting programs. Using the ball and stick approach, all upper and lower case manuscript letters can be formed from horizontal, vertical and diagonal strokes, and counter-clockwise circles. In all cases, the strokes are to be made in a top-to-bottom and left-to-right progression to promote uniformity of letter formation and also to instill a sense of left-to-right progression across the page, a kinesthetic, visual and muscular ability necessary for flowing and rapid movement in both reading and writing exercises. In some instances, left-handed students are permitted to make clockwise circles, but most often no special provisions are made for the sinistral child. Examples of ball and stick letters are given

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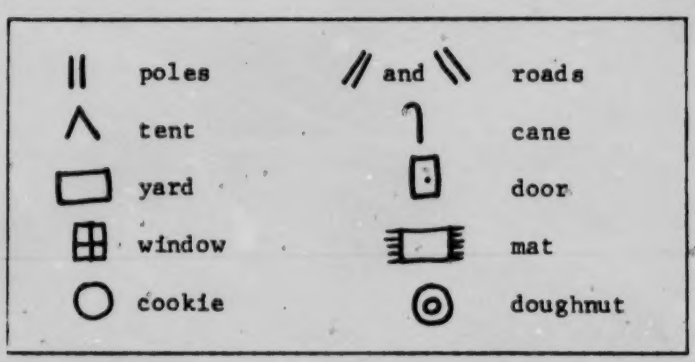

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in Figure 2 below.

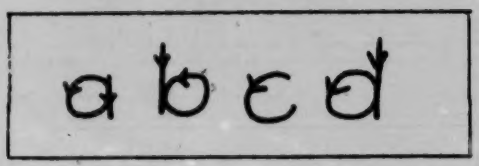


Figure 2: Sample "Ball and Stick" Letters. Arrows indicate direction of basic strokes.

A much smaller number of guidelines advocate the use of "continuous stroke" letters, which, as the name suggests, enables the child to form most discrete lower case letters without lifting the pencil from the page. Letter forms using this technique are more similar to flowing cursive script, and are in fact used by those teachers who believe that the transition to cursive in Grade 2 or 3 will be made more easily by students using continuous stroke manuscript. Examples of these letters are given in Figure 3 below.

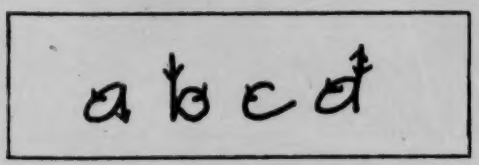


Figure 3: Sample "Continuous Stroke" Letters. Arrows indicate direction of basic strokes.

Initial letters in Kindergarten are usually made with a paintbrush, marker, crayon or chalk on newsprint or other unlined surface, using gross arm movements, rather than fine hand and finger movements required when pencils or other small-point writing instruments are used. Once the basic letters have been mastered on newsprint or chalkboard, the teacher may then proceed to have students manipulate large printing pencils on regular sized unlined paper. Quite often newsprint is folded into smaller and smaller sections so that one completed letter or designs fills each section of the page.

In Grade 1, students are expected to form letters on large lined paper, with letter size being reduced during Grade 2. In the latter part of Grade 2, or the beginning months of Grade 3, students are then required to make the transition from manuscript to cursive script. Typically, cursive letters are taught without using a joined manuscript in the

transition phase, although in some schools such a practice is encouraged. Most often letters are learned in "families" of similarly-formed symbols, such as those upper and lower case ones listed in Figure 4 below.

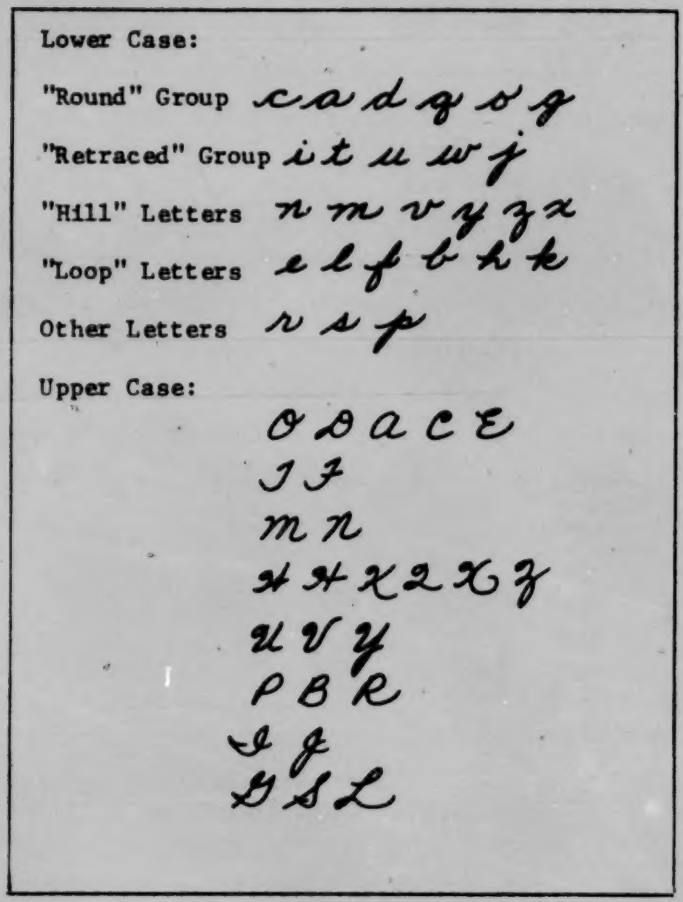


Figure 4: Cursive Letter Groupings

Once all lower case cursive letters have been learned, students can begin writing, typically using upper case manuscript symbols until the upper case cursive counterparts have been learned. In most boards, cursive remains a secondary writing mode until Grade 4, when all classwork is expected to be completed in written form.

During Grade 4 and later grades, it appears that emphasis is placed on increasing speed and fluency. Some guidelines actually provide "Speed Guides" which indicate to the teacher and student the optimal number of words or letters that should be produced per minute in various grade levels. An example of such a Speed Guide is provided in Figure 5 following:

Gr. 3 = 40	letters	per	minute,	or	1.7	sec.	per	letter
4 = 50	"	"	"	"	1.2	"	"	"
5 = 60	"	"	"	"	1.0	"	"	"
6 = 67	"	"	"	"	.9	"	"	"
7 = 74	"	"	"	"	.8	"	"	"
8 = 80	"	"	"	"	.7	"	"	"

Figure 5: Speed Guide for Grades 3 to 8

In the early grades it is recommended that formal handwriting instruction be given in 10 to 15 minute sessions, five days per week. Then, by Grades 5 and 6, the number of sessions per week is usually reduced to 2 or 3. Without continued drill and practice, it is felt that the skills learned in the first four grades would quickly decay into a state of illegibility.

Methods of Instruction Advocated

The actual process of teaching children to print and write involves a consideration of posture, pencil and paper positioning, drill and practice exercises, evaluation techniques, and so forth. As was the case in the overall program of instruction for handwriting, very few differences among board guidelines exist for the actual methods of instruction suggested.

Not all guidelines devote attention to postural considerations, but those that do suggest that the writer sit erect, with feet resting on the floor. It is important that the desk fit the child so that thighs are placed in a horizontal position. The writer should face the desk squarely with forearms resting on the desk for approximately three-quarters of their length, and the elbows positioned about 7.5 to 10 centimeters away from the body. The dominant forearm should then form a right angle with the base line of the writing, with the hand resting on the third and fourth fingers, rather than on the side. The hand should remain level, with the palm facing downwards, until the wrist is also level.

It is recommended that the pencil or pen be held between the thumb and second finger, with the index finger gently curved and resting on the writing instrument. Holding the writing instrument loosely is also

encouraged, insofar as it prevents undue pressure on the writing point, thereby preventing increased tension and fatigue for the finger muscles. Most guidelines include illustrations showing the proper hand position on the page and finger position on the writing instrument (see Appendix 1). It is assumed that by having the body in the proper position, the actual act of writing will be much easier to complete.

Teachers are usually told to begin writing lessons by demonstrating the letter forms on the chalkboard, and then having students reproduce these forms in the air or on the surface of the desk using gross arm movements. Once several "invisible" letters have been made in this manner, it is suggested that the students copy the letters on the chalkboard or in their notebooks. In some cases tracing exercises are suggested, using ditto masters, but copying is a much more popular method of practise in the majority of Ontario's handwriting programs.

In some of the guidelines, general formational rules are also presented, so that as the letter is being learned, the teacher points to the basic rules that govern the formation of all individual letters or families of letters. For example, in printing, those guidelines using the ball and stick approach require that all strokes be made from top to bottom, or left to right; that the letters be constructed in a left to right progression; and that circles be made in a counterclockwise motion (see Appendix A). In cursive script, several guidelines have suggested that: all downstrokes should be straight and parallel while all upstrokes are curved; all small letters and words end with an upstroke; students should complete the writing of the entire word before dotting i's and j's, crossing t's and x's, and inserting apostrophes; and so forth. (Appendix B gives a sample of one set of rules for forming some lower case letters.) As well as having general instruction for the entire class, the teacher is also expected to supervise individual students as they complete copying and tracing exercises at their seats. Because it is possible to make letters incorrectly, yet end up with letters which look correct, it is important for the teacher to spot errors in formation as they occur.

In addition to mastering letter formation or proper letter shape, the student is also expected to master uniformity of slant, spacing and size, and to develop a reasonable amount of speed. Lined paper is used

to enable the child to attain consistent size (see Appendix C for paper samples); slant guides, or diagonally lined sheets to be placed under the writing sheet, are used to promote uniformity of slant (see Appendix D); and one finger space between words is used to promote consistency of spacing. It is believed that speed will increase as the child internalizes the various letter forms and makes them readily available for future recall.

Evaluation Procedures

In order for the student to realize that she/he has made errors in letter form, slant, spacing or alignment, there must be an evaluation process which points out needed areas for improvement. In Ontario's school board guidelines on handwriting, both teacher evaluation and student self-evaluation are usually considered. In most cases it is suggested that they be used concurrently to ensure that both the teacher and student obtain a clear picture of the student's handwriting ability, and also to involve the student in a self-evaluation process, whereby he/she must consider his/her own penmanship in a critical manner. In many cases, teacher evaluation and student-evaluation checklists are provided in the guidelines, pointing to specific aspects of the handwriting sample to be scrutinized. Such checklists are presented in Appendix E.

Most often it is suggested that students' writing be graded on the basis of improvement over previously written assignments, rather than on comparison of the writing with some absolute scale. This approach recognizes the fact that not every child has the motor coordination and acute preception needed to produce excellent handwriting results. However, it is assumed that stars or higher marks given for improvements in their work encourage students to try harder to produce high quality handwriting. In the upper elementary grades, considerable individuality in terms of style is expected, and many guidelines suggest that since handwriting is an important means of self-expression, non-standard letter forms should be accepted, so long as they remain legible and do not prevent the development of a fluid handwriting motion.

A small number of the guidelines encourage teachers to consider the quality of their own daily writing on the chalkboard, suggesting that if teachers do not present top quality models in their work, then they cannot expect students to consider handwriting as an important curriculum task.

Instruction for Left-Handed Students

For the most part, school board guidelines do have a short section on handwriting instruction for sinistral students; however, the information provided often suggests that left-handed children can write as easily as their right-handed fellows if the paper is slanted to the right instead of to the left and if the student keeps his/her hand below the writing line, so as not to impair vision or smear the ink. Quite often, teachers are told not to allow students to write in a "hook" position under any circumstances, although, based on the work of Levy and Reid outlined in the previous chapter, it does seem possible that for some left-handed students, this is the most natural way to write.

Other guidelines suggest that left-handed students should not be allowed to write with a "backhand" slant, with some maintaining that only a forward slant is desirable, and others claiming that a vertical style would be acceptable. These guidelines suggest that backhand slant is associated with higher illegibility and slower writing speed, although these notions are never supported by research evidence.

Several guidelines suggest that absolutely no handwriting instruction be given until a hand preference is shown by the child. Several tasks which are supposed to help the teacher determine hand dominance are included for this purpose, being geared towards the activities of the Kindergarten child. When the child begins printing in Kindergarten and Grade 1, those guidelines advocating the ball and stick approach most often suggest that left-handed students be allowed to form circles in a clockwise motion, since this is the natural circular movement for sinistrals. However, a few claim that all circles should be made in the counter-clockwise motion, since this is the fundamental circular movement of cursive script.

Because windows are placed on the left side of the classroom in order to provide proper lighting for dextral students, this arrangement can cause the sinistral student to shadow his/her own work with the writing hand. Hence, it is suggested in several guidelines that sinistral students be placed as far away from the window as possible, in order to minimize this problem. Most guidelines considering the needs of the left-handed writer also suggest the use of left-handed desks, scissors, and any other equipment that makes motor tasks for sinistral students easier.

Several of the school board guidelines do show a real understanding of sinistral writers and why they adopt their hand movements and pencil holding in the manner in which they do; but in a substantial number of board guidelines, there appears to be an undue emphasis on having the sinistral student behave in basically the same manner as his/her dextral fellows.

Remedial Handwriting Instruction

Only two of the guidelines reviewed had any mention of remedial handwriting programs or specialized instruction for children with learning problems. Those that considered these topics did so in a very general way, suggesting that only one aspect of the handwriting task be dealt with at any point in time, so that the student can put maximum effort into correcting that particular error. In addition, much praise and encouragement are suggested so that the student becomes confident about his/her ability to achieve.

One of the guidelines does go into a bit more detail than the others by suggesting the use of materials from which good visual feedback can be obtained: colored red and green dots as directional cues, oval rather than round shapes for ease of letter formation, increased letter size and spacing for better letter and word discrimination, association of letters with objects of interest to the child, introduction of only one letter per lesson, and instruction in small groups of only 4 to 6 children per group. None of the guidelines considered the teaching of handwriting to children with very serious learning disabilities, but geared all comments to students with minor learning problems.

Conclusion

In those school boards having curriculum guidelines for handwriting instruction, teachers are provided with a basic resource document which typically outlines the basic objectives for each grade level, and also provides some recommended activities for meeting these objectives. However, as was suggested earlier, these guidelines vary greatly from board to board, with some giving a great deal of assistance to teachers in terms of literature reviews, theoretical considerations, resource materials, and so forth, while others provide only a breakdown of objectives and desired handwriting skills on a grade-by-grade basis. In some boards it appears that teachers are required to follow these guidelines

extensively in their handwriting lessons, while in other boards they serve merely as a resource document for those teachers requiring assistance. In the following chapter, we will examine the actual teaching methodologies utilized by teachers in the classroom, and consider the comments made by those individuals concerning the utility of existing handwriting materials made available by their school boards (including guidelines) as well as the need for additional curricular materials in this area.

4 Survey of Methodologies Employed

Although school board guidelines can provide us with a relatively clear indication of how administrators and specialists feel that handwriting should be taught in any given board, there is no guarantee that the methodologies being employed in the classroom actually do conform to those presented in the guidelines. In this chapter, we examine some of the methods of instruction that teachers are in fact using in the classroom. Through non-participant observation and discussion with the teachers involved, it was possible to get a much clearer picture of the mechanics of handwriting instruction and the problems that arise in successfully reaching the objectives outlined in the curriculum guidelines.

Nature of the Schools Participating in the Study

Of the 63 Ontario school boards that responded to our request for handwriting guidelines, 23 indicated that they were interested in participating further in the study. Twenty-two were unwilling or unable to participate further, and the remaining 18 were undecided. Table I indicates how these school boards were divided according to the existence of guidelines and whether the boards were public or separate.

Table I

School Board Type, Presence of Guidelines, and Willingness to Participate

	Public Participation			Separate Participation			
	Yes	Maybe	No	Yes	Maybe	No	Total
Guideline	10	8	10	1	0	5	34
No guideline	6	7	6	6	3	1	29

From the 23 boards that were willing to participate in the study, six were finally chosen: one separate school board with guidelines, one separate board without guidelines, three public boards with guidelines, and one public board without guidelines. Within each of the six boards, two elementary schools were chosen by school board personnel, in consultation with the various school principals. In addition, three other schools were selected because of the unique nature of the handwriting instruction employed: two that taught cursive script in Kindergarten and continued its use throughout the elementary grades, and another that used a joined manuscript style for students making the transition from manuscript to cursive in the latter part of Grade 2. Those schools agreeing to participate in the handwriting survey were subsequently informed about the nature of the study, and the sort of data collection that we wished to carry out.

Classroom observations of handwriting instruction in all elementary grade levels, and interviews with teachers, principals and students were planned for each school. The observations were deemed to be of major importance in the study because they would allow us to see how teachers actually conduct handwriting lessons, how resource materials are utilized, how much time is spent on instruction, and so forth. The teacher and principal interviews were included so that we might discuss how handwriting instruction fit into the entire curricular program, what methods of instruction were being utilized and why, what sorts of problems were being encountered, and so forth. Although handwriting samples were to be collected from classes within each grade at the various levels, it was also decided to interview students in order to see how they felt about the importance of handwriting, and to uncover any problems which they encountered in the writing process.

In order to facilitate data collection, interview schedules for principals, teachers and students, and classroom observation checklists were created and utilized throughout the study (see Appendices G-J). The data collected through this process forms the basis for the analysis presented in the following pages. We will begin this analysis with a general description of the handwriting programs that were employed in the schools visited, and then report on the basic handwriting objectives formulated by various teachers in the sample schools, the numerous methodologies and training materials used to achieve these objectives, the evaluation processes

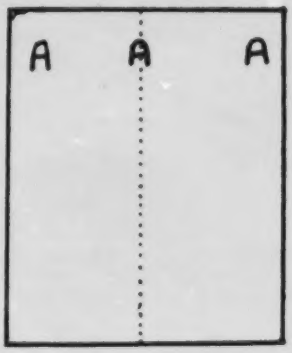
required for student feedback, adaptations for children with special learning requirements, and finally resource materials suggested by teachers that would aid in handwriting instruction.

Nature of Handwriting Programs

Although handwriting instruction forms a part of the curriculum in all Ontario schools, the attitudes of teachers and principals towards this subject area, and the nature of the programs utilized within the schools vary considerably. For example, in two lower socio-economic status schools, one an inner city and the other a rural farm school, teachers seemed to feel that handwriting instruction was of minor importance in comparison with other social and cognitive skills lacking in the students. In the inner city neighbourhood, the principal of the school reported that a large proportion of the population consisted of newly immigrated families, whose parents were unconcerned with their children's education and who therefore provided little encouragement for those children to excel in academic pursuits. The resulting negative or uncommitted attitude towards schooling on the part of these students left teachers with major problems teaching basic reading and mathematics skills, so that handwriting remained a very low priority. Very similar attitudes on the part of teachers existed in one of the poorer rural schools visited, although in another poor rural school, just the opposite attitude was evidenced. Here, it was pointed out that students who do not achieve well in most academic subjects can often excel in handwriting, thereby improving self-concept and increasing motivation. When a child begins to feel competent in at least one subject area, then she/he may feel a greater desire to achieve in other areas as well. For this reason, handwriting instruction was considered to be very important within the school, but especially in the lower grades.

In the two schools where cursive was taught from Kindergarten onward, the program was developed initially by a special education teacher who saw how cursive script helped give a sense of word unity, and a sense of left-to-right directionality, which the manuscript style could not. She reasoned that if cursive script could be learned as the initial writing mode by students with learning difficulties, then it could be more easily mastered by average and above-average students. Using cursive script exclusively eliminates the need for transition

to a new writing form in Grade 2 or 3, thereby preventing a disruption in the learning process (which may occur when cursive is introduced at this time). In addition, the sense of directionality and unity of the words was seen to facilitate reading, since the skills required in both the decoding (reading) and encoding (writing) processes are essentially the same. In order to facilitate this left-to-right sense of direction, tracking programs, such as those created by Ann Arbor Publishers, were utilized in these schools.



In order to help students achieve a sense of left-to-right progression across a page, one teacher folds a piece of newsprint vertically down the centre and asks her students to make a manuscript character at the beginning,(left), middle and end (right) of the page. Constant exercise of this type has proved useful for students having problems with proper letter positioning on the page.

The one school that employed a printscript (or joined manuscript) style in Grade 2, as a means of introducing the transition to flowing cursive script in Grade 3, did so at the instigation of the principal, who believed that students would encounter fewer problems when attempting to produce cursive letters. The teachers in his school agreed with the notion and began to use the appropriate script books in the "Basic Writing Course" series created by Stothers and Trusley and published by Gage.

The programs of handwriting instruction found in most other schools conformed remarkably to those advocated in the handwriting guidelines reviewed in the last chapter. When guidelines were provided by the board, most teachers followed the general philosophy advocated and attempted to achieve the objectives outlined for their particular grade. In several boards visited, it was the teachers who initially expressed the need for some sort of curricular guidelines in this area, and who finally undertook the research to produce handwriting support documents for their language arts program.

In many of the schools visited, an integrated approach to handwriting instruction was advocated, so that writing lessons could be taught in relation to spelling, reading, and creative writing. In many cases, commercial resource materials with such an integrated approach were utilized. These included the *"Mr. Muggs"* series by Ginn and the *"Creative Growth with Handwriting"* series by Zaner-Bloser.

Handwriting Objectives

Typically, it was suggested that the basic aims of handwriting instruction are to have the students write as legibly as possible, while at the same time maintaining a certain degree of fluidity and speed. As one moves from grade to grade within the schools, however, the underlying objectives gradually change, as the students develop greater motor skills

PLAYTIME *

I found some puddles

When I went out to play,

The sun came shining

And my puddles went away.

I got out my skipping rope,

As happy as could be,

I skipped and I skipped

And then hurried home for tea.

Printing readiness activities can be made more interesting by having the teacher recite and illustrate a poem on the chalkboard, while the students listen and copy. Once they understand the procedure involved, students can create their own designs as the teacher recites. This encourages students to listen carefully and also to use their own imaginations for creating interesting designs.

* "Playtime" appears in the Ottawa Board of Education's *Kindergarten Resource Booklet*, p. 829.

and eye-hand coordination. In Kindergarten, for example, much emphasis is placed on readiness activities, so that the child might attain the necessary level of motor development to easily reproduce alphabet characters. Before these are learned, however, much emphasis is placed on directionality in terms of left-to-right progression, top-to-bottom motion, and clockwise circularity. Where ball and stick letters are employed, these basic shapes are said to be the basic building blocks of all manuscript writing. In almost all Ontario schools, manuscript is taught in Kindergarten, although as was pointed out earlier, two schools visited did teach cursive from Kindergarten onward.

The objectives of handwriting instruction for five-year-olds are usually concerned with recognition of the basic letter shapes and their reproduction on blackboard, newsprint or other unlined surface. Initial letters are expected to be made with large arm muscles, but as muscular control develops, letter size will be reduced as the finer hand and finger muscles assume the major role in letter formation. In several schools, Kindergarten students are expected to print between the lines of wide-ruled notepaper before the school year ends; however, the Kindergarten teachers involved expressed some concern about the readiness of their students to do so. As well as letter recognition and formation of alphabet characters, pencil holding, paper positioning and postural considerations are also stressed, with the aim of instilling proper work habits for later grades.

In only one school visited did the principal insist that handwriting not be taught in Kindergarten. She felt that the students' level of development was just not great enough to engage in formal handwriting lessons at this time. In this one school, therefore, no child was expected to print until early in Grade 1. In all other schools, Grade 1 objectives were concerned with improving the basic printing skills by having the child write on lined paper, remaining between the lines, spacing letters and words properly, and gradually decreasing letter size as the fine muscles developed in the course of the year. Many teachers also were concerned about having the child sit in a proper position to promote ease of writing and also to hold the pencil properly. Without constant supervision in these areas, it was felt that bad habits would quickly develop.

Sammy Says:

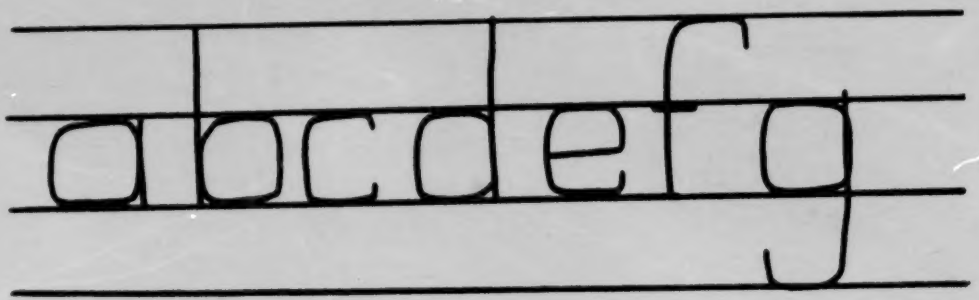
Cramping your fingers
and slumping in your seat
will make you a printer
whose work is far from neat

Peter Pencil Says:

Circles are round
and lines are straight
Both can be found
In printing that's first rate

By using poems, such as those presented above, teachers can present easy-to-memorize rules for proper body posture, pencil holding, and paper positioning. Children could be asked to go through the motions suggested in the poem as it is recited aloud by the class.

Several teachers insisted that students at the Grade 1 level should not be allowed to print with a slant, in spite of the fact that slanted cursive would be introduced in later grades. It was felt that one of the major advantages of teaching manuscript in the early grades was its similarity to printed text, which was an aid in the reading process. If alterations in the basic letter forms were permitted, then students might see the textbook print and their own manuscript print as two different sets of symbols. It should be pointed out here that those teachers using cursive script in Kindergarten and Grade 1 expressed no concern in this area. They felt that students easily made the association between slanted cursive letters and their printed counterpart in textbooks.



A Grade 1 teacher, finding that her students were forming lower case manuscript letters poorly, created this box-like printing style, which caused her students to form rounded boxes instead of circles, usually employed in the "ball and stick" method of printing. By having students move their pencils along the upper line and baseline, uniform letter size and shape could be achieved; whereas, with the use of circles the students would barely touch these lines, thereby creating letters with non-uniform circular shapes.

Handwriting instruction in Grade 2 is usually aimed at refining manuscript skills and developing a neatly organized writing style. In all schools, increased legibility was seen to be the primary objective, with speed seldom emphasized. It was argued that only by having the child form the letters slowly but correctly would a neat and legible style emerge. The refinement process also entails a reduction in basic letter size, with a movement to more narrow lined paper. This reduction process requires the student not only to make smaller letters, but also to reduce spacing between individual letters and words.

In several schools, cursive script is introduced in the second half of the Grade 2 school year, with lower case cursive and upper case manuscript typically used at this time. However, as was indicated earlier, one school visited employed a joined manuscript style, in the belief that this would make the transition to cursive more smooth. For the most part, cursive is not introduced until the beginning of Grade 3, with Grade 2 writing activities devoted to improving the basic manuscript skills learned in Kindergarten and Grade 1.

With the introduction of cursive, the obvious objective is to have students recognize the basic upper and lower case letter shapes and then have these shapes internalized for future recall. Once the mechanics of

individual cursive letter formation have been mastered, there are also the problems of joining the discrete letters into complete words. Although most letters join fairly easily, there are some problem combinations such as br, oa, and os, which require additional drill and practice. Quite often, initial cursive writing uses a vertical style, with slant being introduced at a later point in time. When forward slant is introduced, there is the additional consideration of uniformity of the writing angle, which may take some time to master.

In Grades 4 and 5, much less time is devoted to handwriting instruction in all schools. Teachers, though, are still concerned with legibility in written work and emphasize increasing fluidity and speed. Grades 4 and 5 are seen to be a time for refinement of the cursive script, with attention placed on consistency in slant, spacing, size, and so forth. Several teachers also commented on the importance of the total organization of written work at this time, with students encouraged to produce a visually appealing finished product. One thing that was quite noticeable in almost every school visited was the absence of continued practice of manuscript printing in the upper elementary grades. Quite often students were expected to use printed alphabet characters on posters, graphs, map work, and displays, but there was seldom evidence of printing practice in handwriting exercise books beyond the Grade 3 level.

In the upper grades teachers feel that much individuality is expressed in handwriting, with students incorporating various artistic flourishes to their style. Most teachers believe that such individuality is quite acceptable as long as the writing remains legible. Indeed, this new interest in style is often seen to result in a greater pride in the work completed by the student.

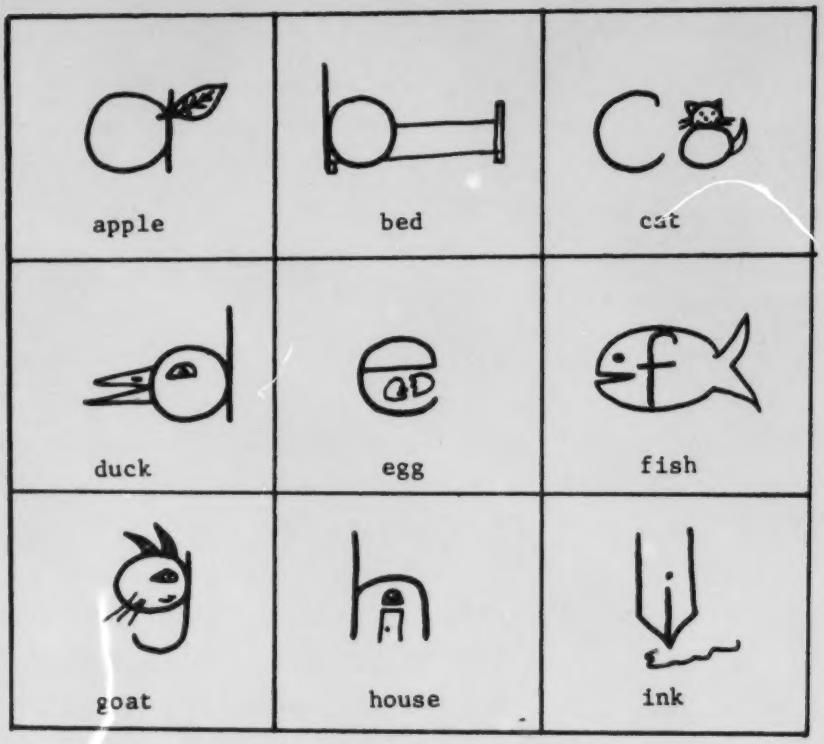
In many cases, students from European and Asian countries come to Canada with a much different writing style. For example, Portugese students in one school visited had a distinctive "squared" letter formation style in their cursive script, which the teachers recognized as an acceptable writing mode. They felt that to attempt to have these students learn another writing style would be a wasteful process, since the existing script was quite legible, incorporating a certain artistic quality.

Techniques and Materials Used

Because Kindergarten is seen as a time of readiness for handwriting, many of the activities provided for Kindergarten students concentrate on gross and fine motor development, eye-hand coordination, kinesthetic feedback, and so forth. Before any letter shapes are introduced, a great deal of time is spent on developmental tasks such as peg boards, bead work and other games requiring motor skills; and design copying using finger and brush painting on newsprint and chalkboard. Many teachers fold newsprint into small squares and require the students to copy simple designs (see Figure 1, Chapter 3) with one in each square.

Once the teacher feels that the class is ready to undertake the mechanics of handwriting, letters are presented on chalkboard or easel, and students are required to copy the shapes with paintbrush, marker or crayon on newsprint, with chalk on the chalkboard, with a finger in a sand box, or with rolls of modelling clay. As the motor skills of the class develop, the size of the letters are gradually reduced. In order to provide kinesthetic feedback for students learning to print, letters cut out of felt or sandpaper are frequently used, so that the student can trace over the letter shape and get a "feeling" for how the letter is formed on a two dimensional surface. The textured surface of these cut-out letters has produced excellent results with children having problems mastering proper letter shapes.

Quite often, the initial letters learned by a child are those which comprise his/her first name. This is not only highly motivating for the child, but also aids the teacher in identifying a student's work when the child can print his/her name on the assignment. When letters are first presented to a child, the teacher usually describes the letter as she is forming it. In some cases rhymes are used, which relate the letter to its sound and also to an object that looks like the letter. Because a letter which looks perfect could have been formed improperly, teachers watch how the child creates each character. To ensure effective supervision, small groups of students are often taught at one time, while the remainder of the class is engaged in other activities.



In order to have students internalize shapes of individual alphabet characters, a visual alphabet, like the partial one illustrated above, can be created. By having students associate the letter shape "A" with the corresponding picture of the "apple," in which that letter is contained, additional cues for proper letter formation are provided for the child. Students can also be asked to create their own picture alphabet, drawing figures which have special meaning for themselves.

Some teachers use work sheets for tracing and copying alphabet characters. In one particular case, the first letter on the page was formed with a solid line, the next with a dotted line, and the third with only a few dots marking the starting point of the letter. The remainder of the page was then left blank. A child using this sheet would trace over the solid letter with his/her finger several times, before tracing over the dotted letter with a pencil. The third letter would be completed

where the beginning dots indicated, and then the remainder of the page would be used for copying more of the letters. It was felt that through this gradual reduction of cues students would find it easier to internalize the letter shapes while forming them properly.

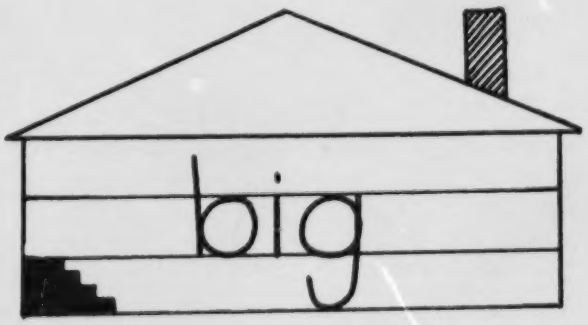
In at least one school visited, teachers used small cards with all of the letters of the alphabet printed on them, so that students could have easy access to proper manuscript or cursive letter forms. The teachers involved were concerned about the ability of some students to accurately copy letters from models at the front of the room to notebooks on their desks.

Several Kindergarten teachers pointed to the difficulties that arise when students come to school with a complete knowledge of letter formation. In one school, a teacher estimated that over one-quarter of the beginning students typically know how to reproduce the entire alphabet. Those students who do know alphabetic characters most often form them in a haphazard manner, which causes real problems when the teacher attempts to have them formed according to his/her model. One school has attempted to ameliorate this problem by contacting parents of pre-schoolers one year prior to Kindergarten entry, so that alphabet cards, with proper letter formation indicated, can be used by those parents desiring to teach the alphabet at home. Although the letters may be formed properly when parents use these alphabet cards, there still remains the problem of pencil holding, paper positioning and postural considerations. It was suggested several times that if a student holds a pencil improperly at the beginning then she/he will always do so. Given the large number of students in Kindergarten classes, it is virtually impossible to re-teach skills already learned at home.

A great deal of art work is usually incorporated into printing lessons. As a beginning to the reading and writing process, the creation of a picture book, in which the student draws pictures of objects and then prints the name of each object below the appropriate picture, is seen to be highly motivating to most students. Similar results were obtained by other teachers through the use of wall posters which concentrated on a particular theme.

As was suggested in the previous section of this chapter, the objectives of handwriting programs for Grade 1 students seem to deal with

proper letter formation, keeping within the lines, and reducing letter size. As is the case in most school subjects, teachers use a variety of methods to meet these goals. In order to facilitate proper letter formation, teachers may carefully draw letters on the chalkboard or in students' notebooks and then watch students to see that lines are made in the proper direction and sequence. Students usually begin by using their fingers to write in the air, on the desk, or on the carpet, before repeating the letter in their copybooks. In some instances, teachers supply sheets of alphabet letters, with arrows to show the direction of the basic strokes. A student who is uncertain can easily refer to the reference sheet for assistance.



upstairs (bedroom)

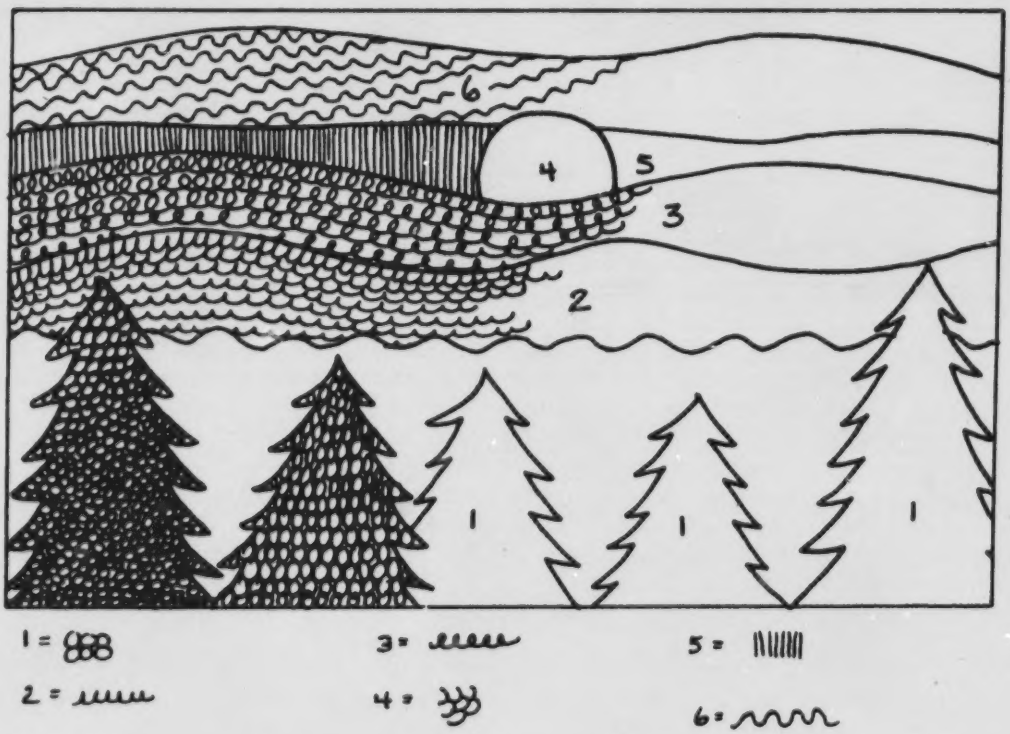
downstairs (kitchen)

basement (cellar)

Some teachers find that a poster containing an outline drawing of a house helps students remember in which space they should draw the various parts of a printed letter. For these students the words "upstairs," "downstairs," and "basement" have meanings which can often be transferred to the lined spaces on their paper. If the teacher uses such terminology in teaching letter formation initially, then students will also begin to use it in creating the letter forms themselves.

In order to get a sense of left-to-right progression across the writing page, one teacher folded the paper vertically down the middle and then required each student to make one letter at the beginning, middle and end of the page. Other teachers use "tracking" exercises, wherein the student moves through a list of letters in a left-to-right motion, finding consecutive alphabet letters. These exercises not only help the student to write fluidly, but also to read with greater ease.

Many schools use 7 x 9 inch "red, blue, blue, red" lined paper in order to aid the child in forming letters properly between the lines. The body of the letter remains between the blue lines, while the tails go below to the bottom red line, and the high letters go above to the upper red line. Some teachers actually line the chalkboard in a similar manner, so that copying from board to notebook is easier for the student. In order to promote uniformity in spacing, several teachers use graph paper, on which students can put one letter per block, leaving one block empty between words. Because graph paper comes in various grid sizes, the size of the letters can be reduced as the child's motor skills develop.



In order for students to create a fluid cursive script, a certain amount of drill and practice in controlled hand motion is necessary. Instead of having students copy line after line of meaningless drill exercises, however, some teachers use a picture outline, such as the one illustrated above, whereby students use colored pens to create interesting pictures, while at the same time performing cursive readiness exercises.

As was mentioned earlier, Grade 2 is seen as a time for refinement of the basic writing skills learned in Kindergarten and Grade 1, so that all upper and lower case letters are re-taught by the teacher and practised by the students. In most cases, techniques similar to those used in Grade 1 are also employed in Grade 2. In a few schools, cursive is introduced in the second half of the year, while in one school visited, printscript (or joined manuscript) was introduced at this time. In most schools, however, cursive is formally introduced in the first weeks of Grade 3, after the manuscript alphabet has been again reviewed. Individual letters are taught on the chalkboard in much the same manner as manuscript was taught, but additional time is also spent on difficult letter joinings.

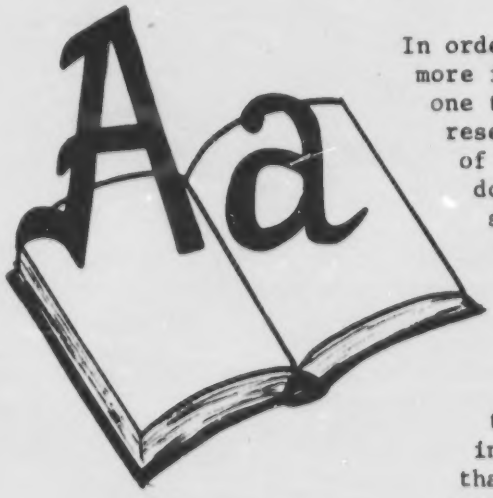
Some teachers actually break individual cursive letters down into component strokes, and have students make each letter in a step-by-step process before the continuous fluid style is achieved. The rationale is obvious: only after the proper letter shape has been internalized should the student be encouraged to produce it quickly. Before any cursive work is undertaken, some teachers require students to perform drill exercises

Because the basic motions of cursive script entail continuous circular movements, several teachers have developed practice exercises in these movements, which result in simple drawings of animals, such as those illustrated above. This approach is much more interesting and meaningful to a child, than is the constant repetition of traditional drill exercises.

consisting of continuous looping (*eeeeee*) and the formation of joined up and down strokes (*mmmm*). Relaxation exercises are also employed in some classes so that muscles are relaxed, allowing them to move smoothly with the cursive letters being formed.

Some Grade 3 teachers teach a vertical cursive script, with a movement to slanted cursive in later grades. Other teachers, however, move directly from vertical manuscript to slanted cursive, without any intermediate stage. Those who use the vertical writing tend to believe that concentrating on uniformity of slant at the same time that cursive letters are being learned is expecting too much from the students, while those who teach slanted cursive seem to feel that the slant is not something external to the basic letter shapes, but very much a part of proper letter formation. In order to help students keep a uniform slant, "slant sheets" or sheets with diagonal lines are placed under the lined writing paper and removed when students are more comfortable with the forward slant.

After Grade 4 less and less time is devoted to formal handwriting lessons, with writing exercises typically incorporated into the remainder of the language arts program. Students are frequently asked to copy poetry from the chalkboard, while the teacher watches to see how letters are being formed and how legibility can be improved. Quite often instruction in handwriting occurs on an individual student basis, although where a large number of students are having problems, specific letters or letter joinings are reviewed and practised on a class-wide basis.



In order to make handwriting instruction more interesting for her Grade 4 class, one teacher decided to have students research the origins and development of the alphabet, examine braille documents for the blind, learn basic sign language for the deaf, and so forth. In this way, her students began to realize that cursive and manuscript writing were only two means of communicating effectively with others. Both the teacher and the students involved enjoyed this approach to the handwriting instruction, with the teacher feeling that student motivation in handwriting exercises had improved significantly.

Several teachers remarked that continued handwriting instruction ought to occur in the upper elementary grades, but that time constraints prevent such instruction from being given. In many cases, teachers believe that handwriting quality deteriorates because formal lessons are terminated, though in a few cases such lessons are maintained on a once-a-week basis until Grade 7 or 8.

One Grade 7 teacher forbade his students to use regular ballpoint pens in school, requiring them to use cartridge or fountain pens, which, he argued slowed the writing speed down because of increased resistance, and in so doing promoted better letter forms and high legibility. In most schools, students are encouraged to switch from pencils to ballpoint pens in Grade 5.

Evaluation and Correctional Procedures

When letter forms are taught initially, teachers watch the students' arm and hand movements carefully, in order to correct any improper motions and to offer assistance when required. In some cases, the teacher begins by guiding the child's hand over the letter in order to provide proper kinesthetic feedback. Where copying and tracing exercises are used in the early grades, teachers sometimes use red ink to make corrections over the letter form produced by the child, so that she/he may see where her/his letter differs from the accepted model produced by the teacher. In several classrooms visited, students are required to complete some of their letter forms on the chalkboard. After several children have done so, the teacher may ask the class to "vote" on the best writing sample. Several children are asked to indicate why that particular model was chosen, with the purpose of having children become more aware of proper letter formation.

Several teachers use stars, happy faces or special stamps to motivate students to produce their best handwriting. In most cases, at least one star is given for every piece of work, with additional ones given when the quality of work improves. Other teachers choose a "writer of the week", a special honor given to that student showing the greatest improvement in handwriting quality. Report cards sent home to parents typically have a category for teachers to indicate the student's ability in handwriting.

Many teachers feel that for this mark all the students work should be evaluated - both daily work and also special writing assignments. In the past, students' writing samples were compared with some absolute rating scale, with higher grades given to those students whose writing conformed most to the model on the rating scale. Today, there is a tendency to evaluate a student's writing on the basis of his/her past work, giving higher grades to those students showing the greatest improvement over time.

In many classrooms visited, there were noticeable inconsistencies between what a teacher said he/she did in terms of providing evaluative feedback to students and what was actually done in practice. In one class, for example, the teacher stressed to us the importance of proper pencil-holding for the formation of proper alphabet characters, yet failed to notice that a large proportion of her Kindergarten class printed with very cramped hands. In another case, a teacher suggested that she had "retrained" all of the left-handed students having a hook hand to now write below the line. In fact, however, at least two of the sinistral students in the class wrote in a hook hand position, without her being aware of their writing style. These cases suggest that ongoing assessment by teachers is essential, else "bad" habits recur.

In the upper elementary grades, more student self-evaluation is expected. A large number of school board guidelines provide student self-evaluation checklists for this purpose, but very few teachers seem to use them extensively. Instead, the teachers usually point out individual errors in letter formation, slant, spacing, etc., to the student concerned or draw it to the attention of the entire class when similar problems are encountered with other students. Many teachers of the upper grades suggest that students quickly develop their own individual style, which should not be altered so long as the writing remains legible. Where problems in legibility occur, however, teachers most often suggest alternative letter forms.

Special Adaptations

By far, the greatest concerns among teachers for special materials arise from teaching handwriting to left-handed students. In some cases, teachers report that they are uncertain what special techniques can be utilized for sinistral students and are unaware of any special materials made available for this purpose. Other teachers feel that sinistral

students adapt well on their own, so that no special instruction or materials are needed for these students. In fact some teachers suggest that left-handed students can be made to feel "different" if undue attention is directed to their sinistral behavior.

Most of the teachers interviewed discourage a hook hand position among their left-handed students, attempting to have them write with their hands below the line. The same arguments as those given in the school board guidelines were cited by the teachers: namely, to prevent ink smearing, and to enable the student to see what is being produced. A few teachers were less adamant on this point, suggesting that they try to change the hand position, but allow the child to maintain the hook hand if complications arise. In one school, teachers used the Zaner-Bloser writing frame, a device which moves the hand in a "below-the-line" position for either left- or right-handed students. According to these individuals, a great deal of success has resulted from the use of this mechanical device.

One of the most common recommendations for left-handed writers is to angle the paper so that the lower right hand corner points to the navel. This paper position is the direct opposite to that recommended for dextral students, whereby the lower left corner points to the navel. For sinistral students who write below the line, the left-handed paper positioning is useful, but for sinistral students who write with a hooked hand the writing act becomes even more uncomfortable, since the hand must hook further in order to produce script on the line. Reversing the angle of the paper to that recommended for dextral writers, however, makes the act of writing much easier for these students, and also allows them to see the script that they are producing, and to avoid smearing the ink. In essence, reversing the angle of the paper changes the "hook" position into a "semi-hook" position.

The attitudes towards a backhand slant among left-handed writers were more lenient on the part of teachers than that suggested in the guidelines, although a few indicated that they request a forward slant by all students, regardless of their hand preference. Most felt that a vertical style or a slightly backhand slant was permissible, since it did not detract from general legibility.

Most schools provide left-handed scissors and left-handed desks, but it was indicated by some teachers that it is often difficult to get a

left-handed desk that is the right size for the student. There is some question as to whether it is more important to provide support for the left arm with a left-handed desk or to facilitate proper sitting position with a desk of proper size.

Materials and Assistance Requested by Teachers

Many teachers who worked in school boards having handwriting guidelines seemed satisfied with the overall guidance that they provide. Indeed, some suggested that no further assistance was required in this area, either because current methods of instruction were achieving the desired results, or because handwriting instruction was felt to be of minor importance in the school curriculum. Where guidelines did exist, it seemed to us that teachers, for the most part, were following the recommended study plan outlined. However, the style of teaching in this area of the curriculum did not appear to differ in the jurisdictions of school boards having guidelines and in those without.

In some cases, it was suggested that access to commercially prepared materials would make teaching easier, simply because of the time they saved: teachers often remarked that they did not have enough time to prepare work sheets and other resource materials for their handwriting classes, and felt that pre-packaged programs would make classes much more stimulating for the children. Other teachers felt that workshops on handwriting could be provided by the board so that teachers could share their ideas in this area. Many indicated that they had some valuable teaching aids that would be of use to other teachers, and hoped that they too could glean some ideas from a workshop with their fellow instructors.

5 Attitudes to Handwriting Instruction

In order for any program of instruction to be successful within a school, teachers, principals, consultants, and students must all be committed to that particular activity area and see its value in the overall school program. In this section, we will examine some of the comments made by such individuals at the schools visited, concerning the role of handwriting in the school curriculum, the need for additional materials and resources, and possible alternative teaching methods for successful instruction in the area of handwriting.

Principals' Views

Most principals that we talked to in the course of the study felt that their teachers were providing adequate instruction in handwriting, especially in the early grades. However, because of time constraints in the upper elementary grades, with a large number of curriculum activities competing for teachers' time, it was often felt that handwriting skills deteriorated somewhat, simply because these manual skills were not practised adequately. In the majority of schools, teachers were given a great deal of autonomy in designing handwriting programs and integrating them with the remainder of the language arts program. When a guideline was provided by the school board, principals typically relied on this document to coordinate handwriting activities from one grade level to the next, since most of these guidelines do in fact provide objectives on a grade-by-grade basis.

Several principals were concerned about the differing alphabetic letter forms being utilized by different teachers in different grades, causing some confusion on the part of the students when instruction is given by a new teacher. In such cases, principals seemed to approach

the problem by encouraging teachers either to agree upon a uniform alphabet to be used throughout the school, or to allow students to use those alphabet characters with which they feel most comfortable, providing, of course, that they are accepted forms of the letters concerned.

When asked about the use of commercially prepared materials on handwriting, such as those produced by Zaner-Bloser and Gage, principals typically replied that the expense involved prevented the widespread use of such materials. When budgets are limited, some corners must be cut, and quite often materials on handwriting are not really given serious consideration. Some principals felt that handwriting instruction merited a greater share of the budget, while others felt that this was not an area where a great deal of resources were required. The latter attitude was especially prevalent among principals of inner-city and remote rural schools, where social and psychological problems often make the learning of basic reading and mathematical skills difficult. The general feeling among principals and teachers in most of these schools was that handwriting quality should be a low priority, in comparison with basic cognitive skills.

Although most elementary school principals did not appear to place a great deal of emphasis on handwriting programs, there was one in particular who expressed very positive feelings on the value of an extensive handwriting program in the elementary grades. She felt that neatly organized and highly legible handwriting was a valuable skill, insofar as it made students aware of the need to produce high quality work that is aesthetically pleasing and easy to comprehend. It was her belief that if such values are instilled in young children, then they will carry over into other activities throughout the child's life. She also felt that instruction in printing should not begin until Grade 1, because students do not have the necessary motor abilities and eye-hand coordination before this time. When these skills are underdeveloped, handwriting tasks cannot be completed properly, and bad habits may be formed.

The same principal also expressed a concern about the quality of the teachers' own handwriting, as well as the emphasis that they place on handwriting quality in class. It was her belief that the quality of some teachers' writing is deplorable, giving students inaccurate and undesirable models to emulate. However, unless the teachers themselves

are prepared to improve their own skills in this regard, she feels powerless to significantly improve the quality of handwriting instruction.

Teachers' Views

Most teachers seemed to feel that current practices in handwriting instruction are adequate for teaching basic legible forms of writing; however, no one seemed confident that these methods of instruction are creating as high a quality of writing as might be attained if additional time and resources were made available for handwriting classes. Most teachers seemed to use a trial-and-error approach to handwriting, employing materials acquired in teachers' college, from commercial publications, from fellow teachers, from curriculum guidelines, or from their own imagination. Although such an approach satisfied many instructors, others felt that some more unified handwriting program could produce better results. In the several board jurisdictions where handwriting guidelines did exist, teachers used these guidelines as indicators of what skills should be taught in each grade level, but were often left on their own to decide exactly how to teach those skills.

Many teachers suggested that the use of commercially prepared materials would be a definite asset in handwriting instruction, since they would provide a developmental program for students, incorporating meaningful activities created by specialists in the handwriting field. Quite often teachers are uncertain as to what activities are the most appropriate in the development of a rapid and flowing handwriting style, and simply do not have enough time to devote to a study of handwriting theories. Obviously, the use of pre-packaged programs for handwriting instruction could help overcome such problems, but, as was indicated earlier, their widespread use is prevented by the expense involved. When teacher guides and student workbooks must be provided for large numbers of individuals, the costs mount quickly. In some cases, teachers feel that more money should be allocated for handwriting instruction; however, the general feeling appears to be that handwriting instruction is not important enough to take valuable funds away from other subject areas.

Many teachers in the upper elementary grades realize that the quality of their students' handwriting fails to improve over time because

the basic writing skills are not practised enough. Although students complete assignments and homework in cursive script, they are not asked to be conscious of the mechanics of writing, in the same way that they would in formal writing classes. The problem, of course, is that there is not enough time for handwriting instruction in the upper elementary classes. New programs in French, music, art, and so forth, take time away from the teaching of basic skills. Some teachers feel that these new programs are of greater importance to the student than the ability to write in a highly legible manner; others continue to feel that the school should be responsible for teaching and maintaining basic skills, such as communicating (in writing) a fluent and efficient manner.

When asked if they could see any deterioration of handwriting quality among students over time, teachers typically responded that the quality of writing remains at about the same level from year to year, although a great deal of variation is seen among the students in any given class. One teacher did feel that in recent years students have come to take less pride in most of their work, developing sloppy work habits, including a messy writing style. Another teacher of Grade 1 suggested that educators tend to make too many demands on students by having them print too early, to always be neat, and so forth. She felt that students quite often get "turned off" by the constant demands placed on them in the school setting.

Very few teachers have had parents complain about the quality of their children's writing, although this has happened in isolated cases. When additional assistance is required to improve the legibility of student handwriting, parents are usually found to be cooperative, insofar as they supervise practice exercises given as homework, after discussing the problem with the teacher and principal. Teachers believe that at least some parents feel that the quality of writing produced by their children is somehow indicative of their general academic ability or the quality of the school program. However, when it is explained that handwriting legibility is unrelated to intelligence quotient scores, they tend to be satisfied that a highly legible writing style is not necessary for academic or occupational success.

As was indicated previously, two schools that participated in the handwriting study taught cursive script exclusively throughout the elementary grades. The special education teacher who worked at both of these schools saw the value of using a joined script for children with learning disabilities, since the continuous motion of cursive gives a sense of left-to-right directionality, an easily flowing movement, and a sense of unity to words. Because children with learning disabilities were seen to manipulate cursive more easily than they could manuscript, the special education teacher reasoned that "normal" students could also benefit from the use of cursive, and also be freed from the need to learn a new and different writing style in Grade 3. In her opinion, and in the opinion of her fellow teachers, this move toward an exclusively cursive writing program has worked well in the two schools, and should be encouraged in more school systems throughout the province.

We also talked to a program consultant from Ann Arbor Publishers about their "Tracking Programs" and "Visual Aural Discrimination Series." She suggested that cursive script is useful for students with problems in spatial perception since the linking of letters in words indicates to the student where one word ends and the next begins. In addition, manuscript was said to require a tremendous amount of muscular control, which the free flowing style of cursive does not require, while producing less kinesthetic feedback than that resulting from the motions of cursive script. Several of the publications from Ann Arbor were used in the handwriting programs of the two schools referred to above.

One program consultant that we talked to was in the process of designing a handwriting program based on the work of Beatrice Furner, reviewed in Chapter Two. It was his belief that teachers spend too much time having children trace and copy letter shapes through meaningless drill exercises. Students become bored with the task, fail to concentrate on the activity at hand, and then produce a quality of handwriting that is less than optimal. He further stated that he felt that most teachers are unaware of the theoretical basis for prescribed handwriting activities, and often assign tasks which do nothing to improve the quality of their students' penmanship. The handwriting program he has created would attempt to engage students in meaningful tasks which would produce

a great deal of visual, auditory, and kinesthetic feedback during the writing process, thereby facilitating the internalization of proper letter shapes. In fact, he would attempt to have every student attain a proper "mental image" of each letter form, before writing the letter. Such a mental image would consist of a clear idea of how the letter appears on paper, the way each constitutent letter stroke is formed, and the ordering of those strokes. The program that he has created is based on Furner's belief that handwriting follows a sequential development, beginning with controlled scribbling and evolving into complex printing and writing skills.

One of the most important aspects of the same handwriting program is the notion of working at the child's own skill level and slowly directing her/him towards the desired skill level. In other words, one should not expect a child to be able to see what she/he must do in order to bring her/his letter forms into conformity with those models produced by the teacher: only by working in small steps, beginning with the child's current skill level and slowly moulding her/his letter forms to the desired skill level, can one successfully improve that child's handwriting ability.

Postural considerations are also deemed to be of major importance in successful handwriting aiblity, insofar as improper body balance puts undue strain on certain muscle groups, causing a general state of body imbalance or dysfunction. The specialist referred to above estimates that 80 per cent of all students hold the writing instrument incorrectly, while about 70 per cent fail to sit in a proper body position. At this point in time, the program he has created has not been employed in any of the schools he deals with, although several workshops have been given, with keen interest shown by many teachers.

Another program consultant commented on the problems that beginning teachers have in teaching handwriting, primarily because of a lack of extensive teacher guides and student workbooks in the schools. It seemed to her that student teachers do not get any specialized instruction in this area and sometimes flounder when they are expected to teach printing or writing to novices. To aid teachers in the schools she works with, she has collaborated with fellow consultants to produce a resource document outlining curricular objectives, handwriting activities, evaluation techniques, and so forth.

Students' Views

Most students seemed satisfied with the type of handwriting instruction that they received in the elementary grades, although a few felt that the tasks associated with handwriting were boring and dull. In the earlier grades, students typically felt that high quality in printing or writing was important in order to get stars, check marks, or praise from the teacher. By Grade 3, however, students were aware of the fact that a flowing and legible style was an asset to themselves, insofar as it allowed them to communicate quickly and easily with other people. Older students even saw the value of having the ability to alter one's writing style for different purposes. They suggested that when one is engaged in writing for personal purposes only, then a rapid style, in which letters are not formed with attention to detail, is sufficient. However, when the objective is to communicate information clearly to others, then a more exacting style is preferable.

Students in Grade 1 who had learned manuscript were asked how they felt about learning cursive script in Grade 3. In almost every case, these students showed a keen desire to learn an "adult" way to write instead of printing, which was sometimes felt to be "babyish". A very few students suggested that they did not want to have to learn another writing style when they had just mastered printing. In many cases these individuals seemed to have had some difficulty learning manuscript letter forms in Kindergarten and Grade 1. Students in Grade 3 were asked about any difficulties which they had during the transition from manuscript to cursive. Most of these individuals reported no great difficulty in this process, although there was a widespread feeling that manuscript was much easier and faster to produce, but was less "fun" to do than the adult cursive script.

Students in the upper elementary grades often attempt to be creative in their handwriting style, incorporating various kinds of flourishes and non-conventional letter forms. When asked about their own style of writing, these students suggested that they realized that their writing did not always conform to those standards presented in earlier grades, but they felt they had developed their own style which was still legible, and which should not, therefore, be overly criticized by teachers. From discussions with teachers, it appears that teachers do in fact allow

students to retain the creative elements in their handwriting, as long as they do not detract from overall speed and legibility.

As a part of the student interview, students were asked to print or write their names and then to evaluate their own writing style. In most cases students did realize when their letter forms, slant, spacing or letter joining deviated from models presented in class, yet did not seem to feel that these deviations were of such magnitude as to warrant concern on their part or the part of the teacher. Quite often when these students were asked to reproduce these deviant letters in the acceptable manner, they could do so without any problem, although in some cases the improper letter forms appeared to be the only ones that the students knew.

With regard to the nature of the handwriting programs within the schools, students were often concerned about differing letter forms used by different teachers in different grades, and found it disturbing when a letter form taught as a model the previous year was considered to be incorrect by their current teacher. Several students felt that teachers moved too quickly through the various letter groupings, requiring them to learn new alphabet characters before they had really mastered those taught previously. Others resented teachers making corrections and comments on their writing books, not really finding these corrections helpful in disposing of existing problems with letter formation.

One student reported that his Grade 5 teacher would not allow students to use a ballpoint pen until a certain quality of handwriting was evident on the part of individual students. This boy felt motivated to improve his writing style in order to use a pen in everyday work, and believed that his fellow classmates were similarly motivated. Another student reported that her teacher periodically displayed handwriting samples on the bulletin board for the whole class to see. She personally tried to do her best handwriting at all times in order to improve her writing skill, since she would feel "embarrassed" if other students thought that she was a poor writer.

Conclusion

Comments by teachers, principals, and consultants seem to suggest that current methods of handwriting instruction are adequate to produce a legible and rapid writing style among most students. However, many also seem to feel that handwriting lessons could be made more interesting and beneficial for the students if appropriate learning materials, geared to the developmental level of the children concerned, could be made available. With limited budgets for curriculum materials, however, handwriting workbooks and teacher guides are often low on a school's list of priorities. Many student comments tended to corroborate the views held by teachers, with an indication that students often found writing activities repetitious, with very little variation in the approaches taken by their teachers.

6 Analysis of Students' Handwriting Samples

Since the major objective in providing handwriting instruction for school children is to produce a reasonably legible and flowing writing style, it follows that the success of any handwriting program can be seen in the quality of script produced by the students. In this chapter we report conclusions about about an analysis of handwriting samples from the various schools participation in the study. The findings suggest how well Ontario students are performing in terms of handwriting skill. We begin with a discussion of the evaluation process involved in this phase of the project, and then report on the results of the analysis

Methodology

Specimens of all students' handwriting were provided by teachers at each grade level in most schools participating in the data collection phase of the study, and were analyzed by means of evaluation checklists shown in Figure 6 (manuscript) and Figure 7 (cursive). Both checklists contain items that are key determinants of handwriting legibility: when any one of these elements is underdeveloped, handwriting quality is significantly reduced. As can be seen from Figure 6, those factors considered in the evaluation of manuscript writing are: (1) proper letter form - having the letter made according to the teacher's model; (2) uniform vertical slant - having the letters all slanting 90 degrees to the horizontal; (3) closed circles - having all circular letters formed with complete circles; (4) lines joining - ensuring that letter strokes join where the model indicates; (5) consistent pencil pressure - maintaining uniform pressure on the writing instrument; (6) proper alignment with the other letters in the word and sentence; and (7) consistent spacing - between letters and also between words. The cursive checklist employs five of these manuscript

MANUSCRIPT CHECKLIST

	LOW			HIGH
	10	20	30	40
PROPER LETTER FORM	☐	☐	☐	☐
UNIFORM (VERTICAL) SLANT	☐	☐	☐	☐
CLOSED CIRCLES	☐	☐	☐	☐
LINES JOINING	☐	☐	☐	☐
CONSISTENT PENCIL PRESSURE	☐	☐	☐	☐
PROPER ALIGNMENT	☐	☐	☐	☐
CONSISTENT SPACING	☐	☐	☐	☐

Figure 6: Manuscript Evaluation Checklist

CURSIVE CHECKLIST

	LOW			HIGH
	10	20	30	40
PROPER LETTER FORM	☐	☐	☐	☐
CONNECTED STROKES	☐	☐	☐	☐
UNIFORM SLANT	☐	☐	☐	☐
CONSISTENT PENCIL PRESSURE	☐	☐	☐	☐
PROPER ALIGNMENT	☐	☐	☐	☐
CONSISTENT SPACING	☐	☐	☐	☐
PROPER LETTER JOININGS	☐	☐	☐	☐

Figure 7: Cursive Evaluation Checklist

categories, but two are altered because of the continuous motion of written script. In the cursive checklist, connected strokes replaces the "closed circles" and "joining lines" of the manuscript evaluation scale, and measures the extent to which letters are formed in a continuous fluid motion. In addition, proper letter joinings is included as the seventh category, drawing attention to how letters are joined together to form a complete word.

Each of these checklist categories was scored from 10 to 40, on the basis of the quality of writing. A score of 25 represented an "average" writing quality in each category, while higher scores indicated exception skills and lower scores indicated areas for imporvement. Two scorers were given the task of rating handwriting specimens from Grades 1, 3 and 5 of all ten schools visited. Because of the time-

consuming nature of the task and the large number of samples collected, it was deemed impossible to evaluate samples from every elementary school grade. On the basis of twenty-nine specimens scored by both evaluatiors, an inter-rater reliability of 0.80 was calculated. This was felt to be of sufficient magnitude to allow reliable comparisons among all the specimens.

Results of the Analysis

Before examining the mean handwriting scores presented in Table 2, it should be pointed out that the overall legibility of printing and writing in the samples produced by students in the various grade levels was moderately high, with very few students displaying real difficulty in reproducing basic letter forms in an acceptable manner. The variation in refinement of these writing skills among students, however, was quite noticeable, and, as we shall see later, was more pronounced among students within any given school than among the schools themselves. It should also be noted that this study was exploratory in nature, and as such, involved the collection of a relatively small sample of data, which allowed us to discover only major differences among the schools involved. For this reason, one should not generalize the results of the study much beyond the actual sample of schools chosen, but should use these results as an indication of areas to be pursued in a more comprehensive study entailing a larger random sample.

Table 2 lists the mean scores for the handwriting samples collected from the schools participating in the study. Seven of the schools were publicly administered, with three of these seven having handwritten guidelines. The reamining three schools were administered by Roman Catholic separate school boards, and one of these three had handwriting guidelines provided by the board. Through discussions with the principal and teaching staff at these schools, we attempted to classify each school as giving a low, moderate, or high priority to handwriting instruction, and also as having a low, medium, or high socio-economic-class composition of its student body. The results of these groupings are presented in Table 3.

An examination of the mean scores in the lower part of Table 2 seems to indicate that initially handwriting quality is generally better in separate schools than in public schools, with a difference of 1.8 points at the Grade 1 level and a difference of 1.1 points at the Grade 3 level

Table 2: Means and Standard Deviations of Handwriting Evaluation Scores

Schools	Grade 1 Mean	Grade 1 S.D.	Grade 1 n	Grade 3 Mean	Grade 3 S.D.	Grade 3 n	Grade 5 Mean	Grade 5 S.D.	Grade 5 n
Public									
A	20.6	3.4	23	26.7	2.7	12	26.1	2.4	35
• B	24.0	3.6	16	24.6	5.6	17	27.9	3.2	12
• C	25.9	2.0	10	25.6	2.5	16	26.9	3.5	25
□ * D	24.6	3.2	27	26.4	2.7	26	27.7	2.3	31
* E	21.0	3.9	16	25.7	2.4	21	27.1	2.4	23
F	22.3	4.4	26	25.9	1.7	11	27.9	5.4	31
* G	-	-	-	26.7	2.4	11	26.4	1.8	28
Separate									
* H	26.7	3.6	20	26.7	2.1	18	28.3	2.6	6
I	26.4	2.0	29	26.9	2.3	29	26.6	2.9	26
J	24.1	4.9	24	27.7	7.1	20	26.7	2.3	27
All Public Schools	22.9	-		25.9	-		27.0	-	
All Separate Schools	24.7	-		27.0	-		26.9	-	
All Schools With Guidelines	23.6	-		26.3	-		27.1	-	
All Schools Without Guidelines	23.6	-		26.3	-		26.9	-	

• Schools teaching only cursive script from Kindergarten onward.

* Schools with handwriting guidelines.

□ Use of squared manuscript letter forms in Grade 1.

in favor of the separate schools but a difference of 0.1 points in favor of the public schools at the Grade 5 level. In the Roman Catholic schools visited in the course of this study, there did seem to be considerably more emphasis placed on handwriting skills than in most public schools visited, although this was not true in all cases. For example, the two public schools employing cursive script from Kindergarten onward (i.e., schools B & C in Table 2) put a great deal of emphasis on handwriting skills in the early grades. It can be seen from the upper part of Table 2 that these two schools had fairly high scores in Grade 1, relative to the other public and separate schools, but had the lowest scores in Grade 3, and then intermediate scores in Grade 5. It is not

Table 3: Social Class Background and Priority of Handwriting Instruction in the Ten Schools Listed in Table 2

Social Class Background		
Low	Medium	High
A	C	D
B	E	
J	F	
	G	
	H	
	I	

Priority of Handwriting Instruction		
Low	Medium	High
A	E	B
	F	C
	G	D
		H
		I
		J

immediately apparent why this drop in ability occurred in these schools in Grade 3, especially when the students in all other schools had learned cursive for the first time during that particular school year. Somehow the head start that the students received at these schools was not maintained throughout the early grades. Several teachers at the schools remarked that one of the benefits of teaching cursive initially is to prevent the re-learning of writing skills in Grade 3, when the transition to cursive is usually made. It may be that Grade 3 teachers feel that their students have acquired the necessary handwriting skills before entering the class, and therefore do not place great emphasis on handwriting instruction. This may be what has happened, at least to a certain degree, in the case of schools B and C.

Looking at the differences between those schools having guidelines and those without, it becomes apparent from the lower portion of Table 2 that very few differences exist in this regard. The schools with handwriting guidelines scored no higher in Grades 1 and 3, but were higher by 0.2 point in Grade 5. This leads us to believe that the emphasis placed on handwriting skills within individual schools is the most important factor in determining the quality of handwriting programs. Where consultants, principals and teachers are in agreement about the importance

of comprehensive handwriting programs, the degree of ability on the part of students in this regard appears to be greatest. In Chapter 5, it was noted that in two of the schools visited little emphasis was placed on handwriting skills because of the "backward" nature of the student population. Teachers simply felt that time would be better spent on mathematics and reading skills. In Table 2, School A constitutes one of these schools (unfortunately, specimens were not provided by the other school where writing skills were given low priority); there it can be seen that Grade 1 students received the lowest scores of all public and separate schools. Although this difference disappears in Grade 3, it reappears in Grade 5, thus lending some support to the view that teacher and administration attitude toward handwriting programs is a significant factor.

Although these class averages allow us to make some very general statements about handwriting quality among the various schools, they do not allow us to see the great deal of variation that occurs within individual classes. The handwriting samples shown in Figures 8 and 9 (and also in Appendix F) illustrate just how great this variation can be. In Chapter Two, the review of the literature suggested that handwriting skills are basically visuomotor skills requiring fine muscular development and eye-hand coordination. Because children differ in their rate of development, and also in their overall level of ability in these areas, it follows that their relative skills in handwriting will also vary considerably.

The standard deviations of the handwriting scores presented in Table 2 and the corresponding graphic representations in Figure 10 give us more insight in this area. Here, we see that schools vary considerably with regard to the dispersion of handwriting scores, around the class mean, indicating that in some classes students tend to have widely differing handwriting abilities, while in other classes, the handwriting quality is more uniform among the students. There do not appear to be any consistent trends among separate or public boards in this regard, nor among those boards having guidelines and those without. However, it is interesting to note that in some schools (i.e., A, D and E), the standard deviations are reduced as one moves from Grade 1 to Grade 5, indicating that the quality of the students' writing is becoming more

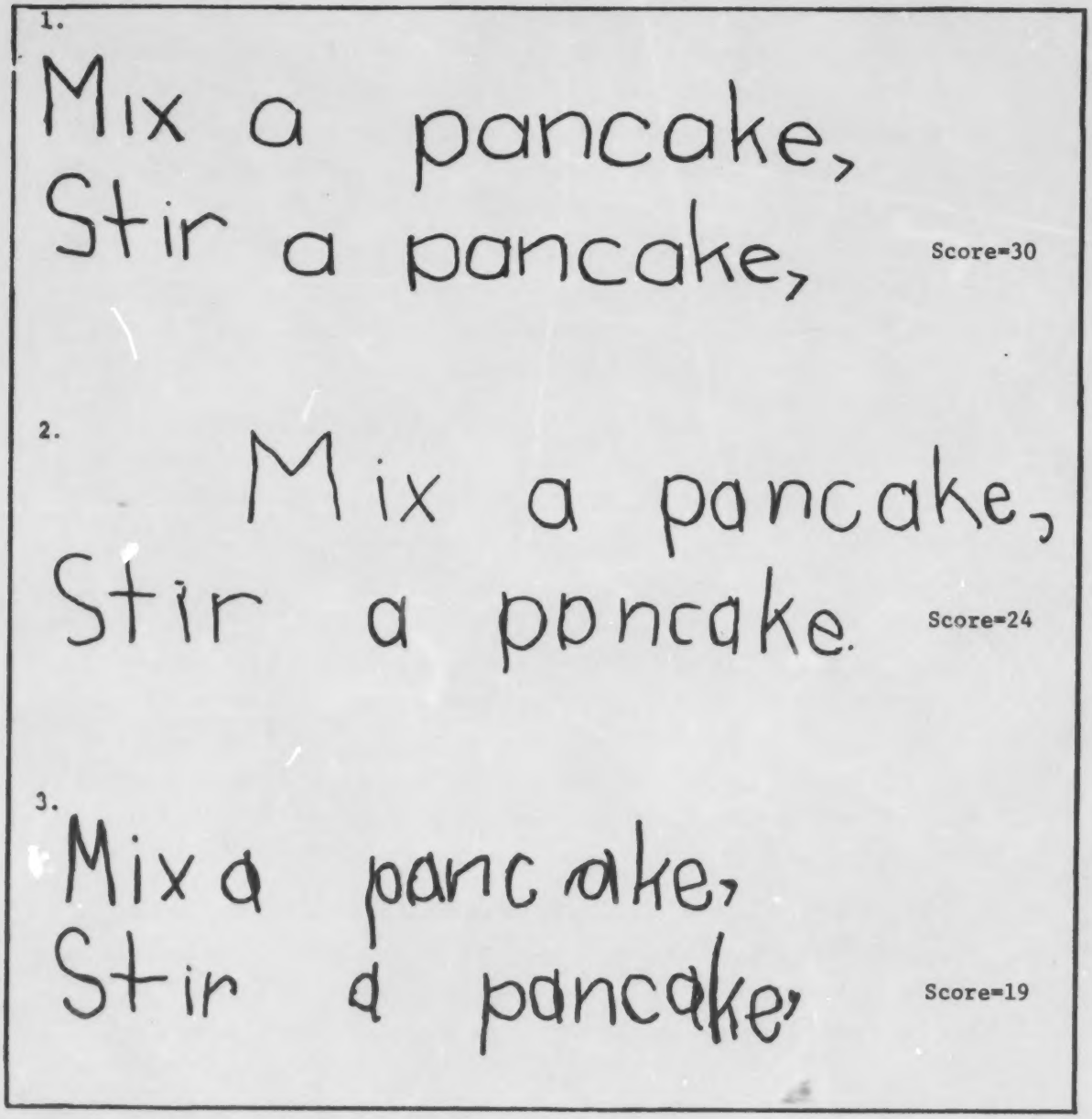


Figure 8: Manuscript Samples From a Grade 1 Class

homogeneous. In other schools (i.e., C and I) the standard deviations increase as one moves from Grade 1 to Grade 5, indicating that writing quality among students is becoming increasingly diversified. These trends, we feel, are due to the nature of the handwriting programs utilized in each of the schools and the amount of emphasis placed on handwriting quality in the upper grades.

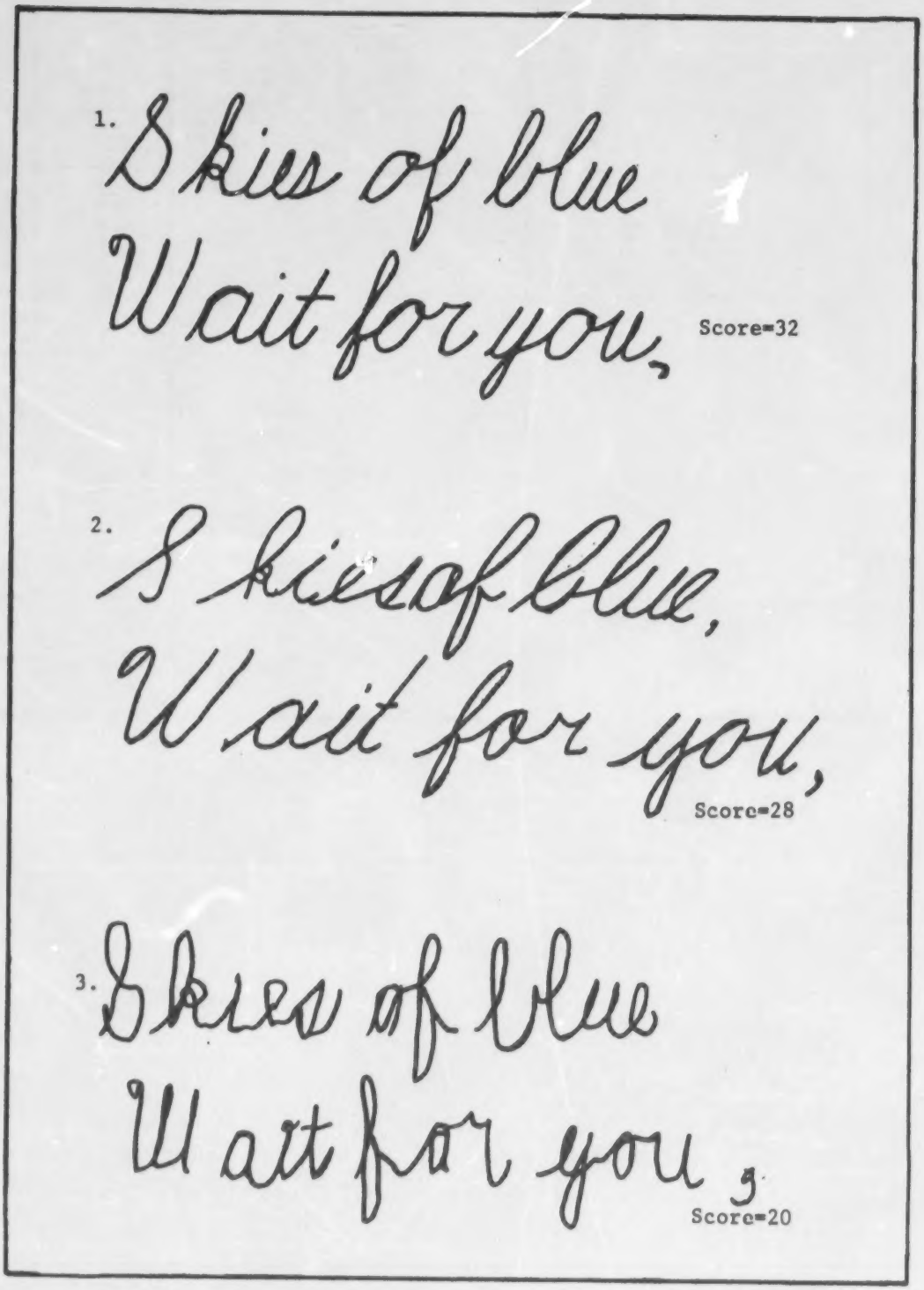


Figure 9: Cursive Samples from a Grade 1 Class

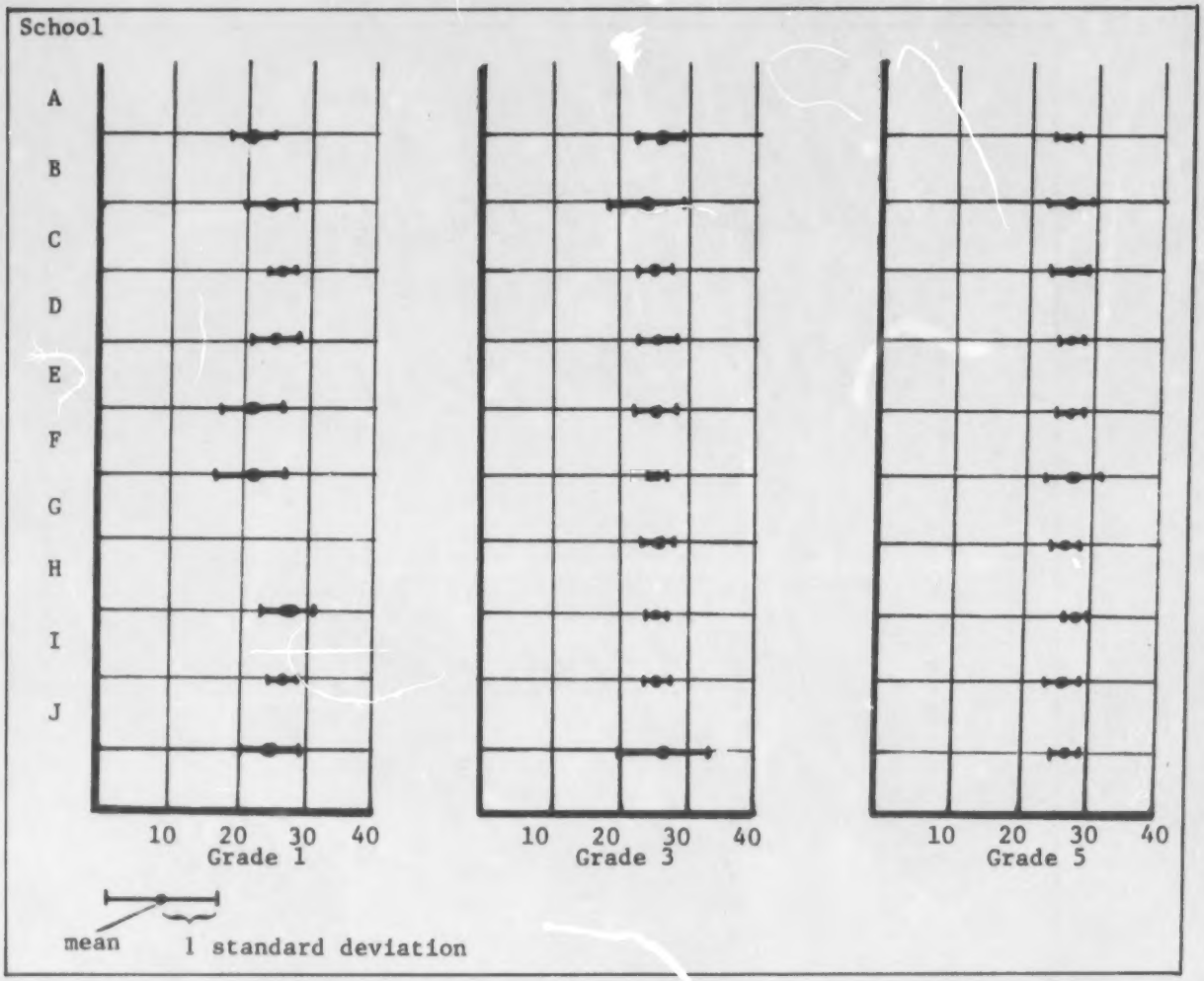


Figure 10: Graph of Means and Standard Deviations of Handwriting Evaluation Scores

Conclusion

The findings presented in this chapter lend some support to the view that students who attend schools where handwriting instruction is stressed as an important skill will have a better chance of becoming more legible writers, all other things being equal. Of course there are many developmental factors that must also be considered in this regard, so that some students will be "poor" writers regardless of the type of program, while others will excel in this area with very little emphasis being placed on writing skills by the teacher. However, in those schools visited where more emphasis was placed on handwriting ability, the overall quality of writing in terms of legibility and aesthetics was generally higher. When

emphasis on writing sk[illegible] dropped in the upper elementary grades, some students may fail to show continued improvement due to a lack of continued drill and practice of this complex motor skill, and a lack of attention to proper arm, hand and finger movements, and proper letter forms. This would suggest that if better quality writing is desired among students, then more time should be devoted to handwriting instruction in the upper elementary grades.

7 Summary and Conclusion

As was indicated in the introductory chapter, the purpose of this study is to describe the methodologies principally used in Ontario schools to teach handwriting in the Primary and Junior Divisions; to explain the empirical basis of each methodology; to measure the effectiveness of each method in the development of legible handwriting; and to assess the effect of each methodology on the attitude of the student toward learning. In addition, a literature review was to be undertaken in order to provide the basis for a support document in the "Curriculum Ideas for Teachers" series, and to provide information that would be of assistance in the professional preparation and development of teachers.

With regard to the first four objectives, concerning an analysis of handwriting methodologies currently being used in the Ontario school system, it was found that very little variation existed in the schools visited, with the exception of those two schools teaching cursive script exclusively in the elementary grades, the school using a joined manuscript or print script in the latter part of Grade 2, as a means of easing the transition from manuscript to cursive in Grade 3 and the Grade 1 teacher who used squared circles to ensure that letters were formed between the lines. Even in these three schools, however, the methods of instruction employed were remarkably similar to those found in the other schools visited. Our analysis of the curriculum guidelines for Ontario's public and separate school boards, classroom observations of handwriting lessons, and discussions with teachers and principals all indicated that the various schools and school boards do not adhere to widely differing or unique theories of handwriting instruction. Indeed, it could be argued that few, if any, actually adhere to any unified theory at all in this

particular subject. Nor did any school employ an extensive commercially prepared handwriting program that was based on developmental theories of psycho-motor and visuospatial refinement. Instead, it was found that teachers typically created their own programs of instruction or employed handwriting guidelines provided by school boards, which seldom, if ever, discussed the empirical basis for the activities suggested, although it appeared that all such curriculum activities had been gleaned from various segments of the handwriting literature, or from experimentation on the part of individual classroom teachers.

As was indicated earlier, one educational specialist had developed an extensive handwriting program, based on the work of Beatrice Furner (see Chapter Two). A discussion with this individual revealed that an enormous amount of time and energy had been expended on the project, but that no school in the board had actually used the handwriting program, although a number of workshops were being given. The teaching specialist who initiated the all-cursive handwriting program mentioned above had also produced a rather comprehensive and well-coordinated handwriting program for the early elementary grades, and also for students having learning disabilities affecting their handwriting skills. In the several schools we visited and the many guidelines we examined, only those programs employing cursive script exclusively in the elementary grades, the school using a joined manuscript transition phase in Grade 2, the teacher using squared circles, and the handwriting project based on the work of Beatrice Furner, stand out as being exceptional.

Because of the enormous similarity of handwriting programs across the province, it was not possible to do extensive comparison among differing methodologies on handwriting quality, student and teacher attitude, and so forth, as we initially proposed. However, we were able to uncover some very important concerns voiced by individuals in the numerous schools visited. Many teachers, for example, were uncertain of what handwriting activities were most appropriate for students having problems with specific letters or with the entire handwriting process. Typically, additional drill and practice were administered to such students without any attempt on the part of teachers to discover the origins of the problems. By providing teachers with some resource materials in this area, boards could eliminate a great deal of frustration and confusion for both teacher and student. We feel that teacher guides and student work-

books produced by specialists would be of assistance to teachers in dealing with special problems in handwriting.

Instruction for sinistral (left-handed) students is a special area of concern among teachers in handwriting programs. It seems that most teachers do nothing to assist these students except to change the angle of the writing paper, to provide left-handed desks, and to attempt to prevent the development of a "hooked" hand position when writing. Because of the research findings outlined in the study by Levy and Reid (see Chapter Two), suggesting that for some sinistral students such a hooked hand position is the most natural one for writing purposes, we feel that teachers should be made aware of the difficulties that might arise through attempts to have these students write below the line.

Several students and teachers have complained about the wide variety of letter forms used within a school, often causing confusion when a child moves from one grade level to the next. In order to avoid such unnecessary frustration for students, we feel that uniform manuscript and cursive alphabets should be adopted for instructional purposes within a school, or possibly within an entire school board.

The ongoing debate about the merits of manuscript and cursive script and the necessity of going through a transition phase from the former to the latter in Grade 3, remains unresolved. It appears that the "average" student is quite capable of learning both writing modes in the early elementary grades without having any great difficulty, while students with perceptual problems seem to master cursive more easily than manuscript, and students with some motor problems learn manuscript more easily. In the two schools that we visited which employed cursive script exclusively for all elementary students, it was indicated to us that cursive script can be mastered by Kindergarten and Grade 1 students as easily as manuscript, and without detriment to the student's ability to read printed text.

It appears to us that the key ingredient for a high quality of writing among students is the amount of emphasis placed on handwriting by the principal and teachers in any given school. When students are required to produce neat and legible handwriting, they usually rise to the occasion; when they are not required to do so, they tend not to place a high priority on that skill, and the quality of writing is

not high. It is particularly important that the emphasis placed on handwriting be continued in the upper elementary grades. When continued emphasis on legibility is not forthcoming, teachers can expect overall handwriting quality, on the part of most students, to cease to improve.

Although "Handwriting Evaluation Checklists" are included in many of the school board curriculum guidelines, only one teacher in all the schools visited actually used checklists with the class. Many others, however, used oral evaluation exercises wherein both teacher and students critiqued a given student's work. If we want students to become critically aware of their own writing quality and deviations that exist between their letter forms and the accepted teacher models, then it seems to us that students should be involved in some self-evaluation process, like that entailed in the self-evaluation checklist exercises.

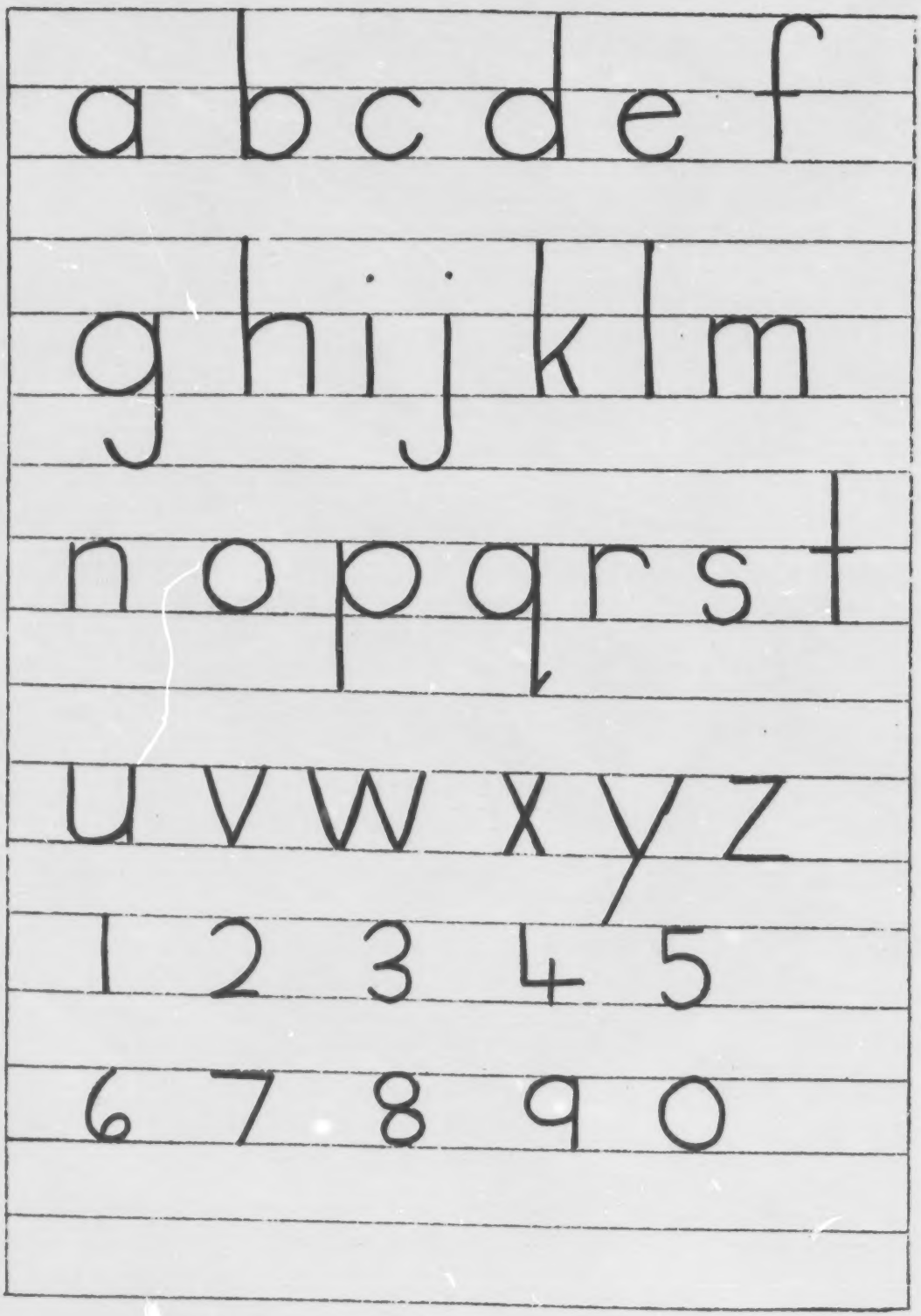
For the most part, it appears that the quality of handwriting in the many samples that we collected is of good quality with few problems of illegibility in terms of letter form, slant, spacing, alignment, or letter joining. There are, of course, significant differences among the students in their handwriting quality, which seem to be due more to differences in the students themselves than in the nature of the handwriting program to which they are exposed. However, as was indicated earlier, students who are required to produce high quality writing are, for the most part, more likely to produce a style of writing in which alphabet characters are well formed and correspond closely to the accepted models produced by the teacher.

Curriculum materials for handwriting instruction have low priority for most teachers and principals, because of the cost of materials. When a limited budget must cover a wide range of curriculum materials, teachers must decide which ones are most important. Invariably, materials for handwriting rank low on the list of priorities. Although most teachers are currently successful in teaching their students how to write in an acceptable manner, we feel that the task would be made easier for them, and in many cases more stimulating for the students, if interesting and well-thought-out materials were made available. When student interest is high, then the likelihood of improved performance seems also to be greater. For this reason, we feel that workshops in handwriting instruction would be beneficial for all elementary school teachers, in order to reassure them that handwriting skills are indeed an important part of the school curriculum, and to allow for a free exchange of ideas on methods of instruction, evaluation, and theoretical considerations.

Appendices

Illustrations in the following appendices (A to E) are samples of materials adapted from the many guidelines submitted by school boards to the researchers. Credit for them is due all boards who responded to our request for materials. Even so, they illustrate only a few of the many styles and approaches to handriting instruction. A collection of some of the more extensive guidelines has been placed in the Curriculum Guideline Collection of the OISE library.

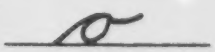
Appendix A: Sample of Recommended Letter Formations for Manuscript


a b c d e f
g h i j k l m
n o p q r s t
u v w x y z
1 2 3 4 5
6 7 8 9 0

Appendix B: Sample of Recommended Letter Formations for Cursive Script

(From a program of the Niagara South Board of Education)

Small Letter Formation



The first up-stroke should be taught as part of the letter.
The slant on this first stroke will cause some difficulty. Make sure the loop is closed. Provide ample practice in joining letters with the elevated cross stroke to all other letters.

Start at the line. Close the loop. Make sure that the final stroke comes down to the line. Make the final stroke full and light.

This letter starts the same as the first part of the "a".

Make the downstroke straight. Get the loop effect on the upstroke.

Keep the final stroke straight. Make the downstroke come right to the line.

u

Make the final downstroke come right to the line.

w

Keep the open parts the same size and height.

r

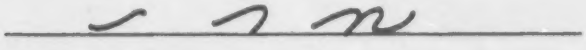
Make a comfortable "seat". Retrace on the first stroke. Go straight out and straight down.

s

The first stroke curves upward. Have a sharp point on the letter (avoid a rounded top). The downstroke is straight.

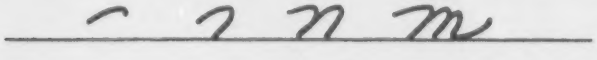
n

It is difficult to make both parts the same size and height. Get a good finishing upstroke on all letters.



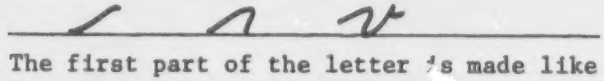
m

Make all three humps the same height and shape.



v

The first top is curved like a "n". Practise, joining the elevated cross stroke to all other letters.

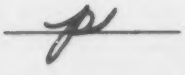


x

The first part of the letter is made like the first part of the "n". Cross at the middle point of the down stroke.

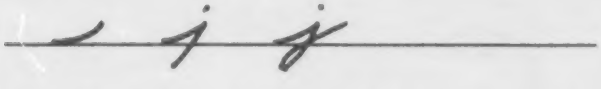
The letter is about 2/3 the height of the looped letters. The cross stroke is about ¼ distance from the top. Keep the down stroke straight.

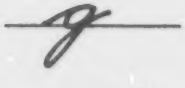
This letter is the same height as the "t". Make certain that the pupils develop the habit of closing the loop.



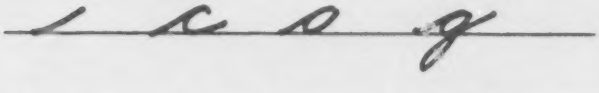
Leave enough space for a small letter under the low part of the "p". Allow a loop on the bottom portion of the letter.

Stress the space between the first and last slanted strokes. The loop should cross at the line. Develop the habit of dotting the letter.

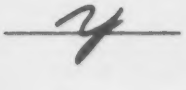


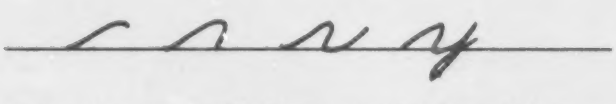


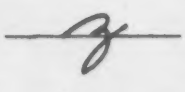
The first part of the letter is like the "a". Close the first portion of the letter. Always cross the loop at the line.



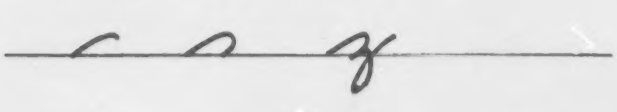
The letter should start as a "v".







There is no small loop at the base line. The rounder the first portion of the letter, the easier it is to make the bottom loop. Pause at the base line before making the downward loop.



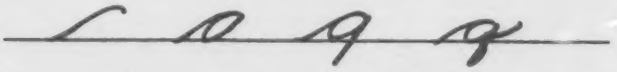
This letter is a full space high. The last downstroke should be straight. Develop the loop on the upstroke. Teach the letter by stopping at the bottom line.

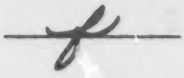
A full space high. Leave a space as shown on the written letter. Keep the downstrokes straight.

Add the last part of "v" to "l". A difficulty lies in making the "v" portion of the letter narrow enough without closing it. In all letters with the loop, cross the first strokes well above the line.

Develop the loop on the upstroke. Keep the crossed strokes well above the line. Close the curved portion of the letter.

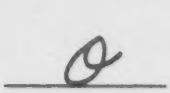
The letter begins the same as the "a". Leave room for a small letter under all down loops. Join the up-curve to the line.



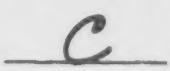


Cross the first strokes well above the line. Keep the downstroke straight. Join at the line. (Space as shown.)

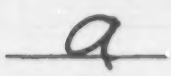
Capital Letters - Recommended Formation



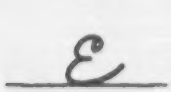
Make a complete oval. Keep the small oval inside the large one. The small oval comes one-third of the way down.



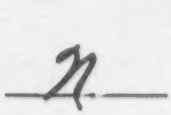
Start at the line and form a small loop and then a normal "c".



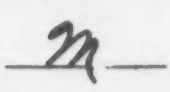
Do not leave an opening at the top of the letter. Finish below the line.



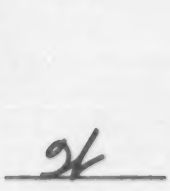
Start at the line and form a small loop. Make round, full "c's". This letter should be joined to lower case letter following it.



Start at the line and form a small loop and then a normal "n". The hump does not go right up to the line. Finish with a light downstroke going below the line.



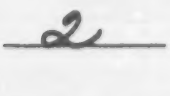
Similar to the "n" with a shorter final hump. The tail cuts below the base line.



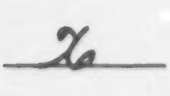
Start at the line and form a small loop. Continue with a wide arc, coming down to the bottom line as far to the left as the beginning of the letter. Retrace with the same slant to the top line. Add a straight downstroke. Retrace with a light movement, ending about a third of a space from the top.

First stroke similar to "w". The second stroke parallel to first. The connecting loop meets the first part of the letter half-way up. Join this letter to the one following it.

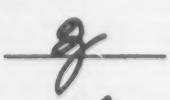
First stroke similar to "w". Unite the two parts with a small loop at half the height of the letter. Keep the letter narrow. The final stroke cuts the base line.



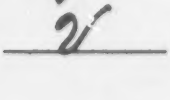
Start at the line and form a small loop then form a number "2".



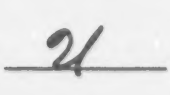
First stroke similar to "w". The second part of the letter should touch the first part. The second part is an inversion of the first part.



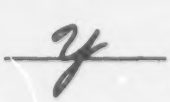
First stroke similar to "w". Make a flat loop at the line. Continue 2/3 below the line.



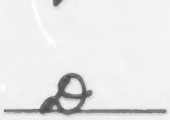
First stroke similar to "w". The upstroke curves up and to the right. The upstroke ends at the line.



First stroke similar to "w". The upstroke goes right up to the top line. The last stroke is a light downstroke ending below the base line.

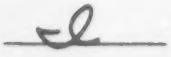


First stroke similar to "w". Make sure the loop crosses at the line on the way up.



Start at the line; make slanted straight stroke. Make a flat loop at the bottom. Continue up with a full, round curve. End with a small loop inside the large one.

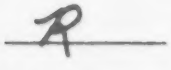
Make a straight, slanted stroke up to the line. Form a small loop. Cross the initial line about 1/3 the distance from the top. The cross stroke slants up slightly. The 4th stroke comes straight down to the line and continues to the left past the initial upstroke. A point on this part adds to the appearance of the letter. Have the last stroke end inside the letter.



The "i" starts at the line and curves up to the left to the line. The downstroke should be kept straight. The downstroke curves to the left at the bottom and a point is placed at the tip, making sure that the last stroke is kept away from the initial line.

The top half of the letter is larger than the bottom half. Make sure the letter starts and crosses at the line.

Start ¼ below the line and slant a curve up to the line. Continue straight down and retrace straight up. Add a full, round curve, and put a point on the letter where it touches the initial upstroke.

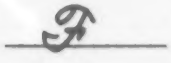


Start as a "P". Make a flat loop at the centre and make a straight line down and slightly to the right. End below the line. The letter is not joined to the rest of the word.

Start as the "P". Make a loop in the middle as in the "R". Place a point on the letter as in the "P".

Start at the line; continue straight down, curving to the left at the bottom of the letter. Put a point on the letter as in the "I". For the top "cap", start at the line and form a small loop. Curve back down away from the line. Do not have any up-curve on the top part of the letter.

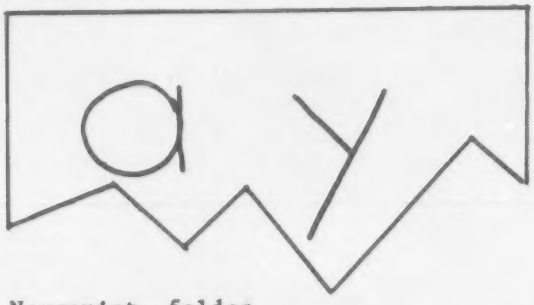
Make the "F" the same as the "T", adding an "across-and-down" stroke to the centre.



Start as a "G", developing the loop on the upstroke. The second stroke comes straight down to the line, curving at the bottom. Place a point on the letter, ending inside the letter.

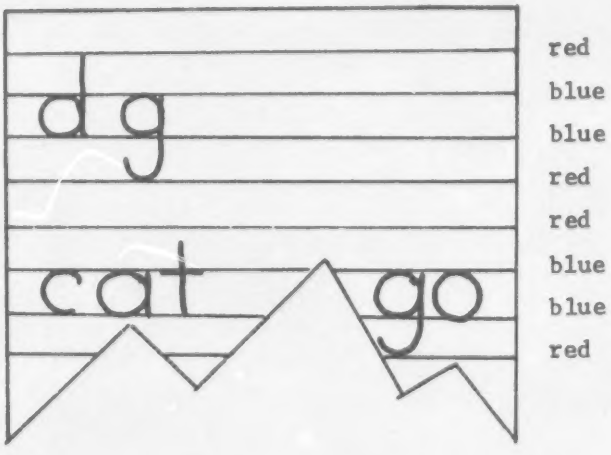
Start the "L" halfway between the lines. Develop the loop on the upstroke. Continue straight down, curving to the left of the bottom. The bottom loop should be flat, with the last stroke of the letter ending below the line. The letter is not joined to the rest of the word.

Stage 1: Newsprint, unlined



Stage 2: Newsprint, folded

Stage 3: Newsprint, 1" lines in two colours. Print between blue; ascenders up to red and descenders down to blue.

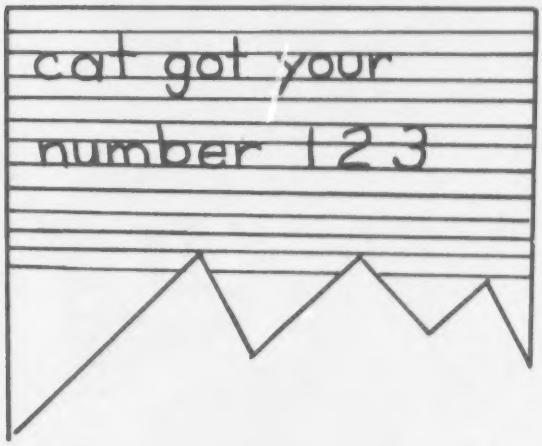


Stage 4: Two colour lines 7/16" apart.
Print between blue; up and down to red.

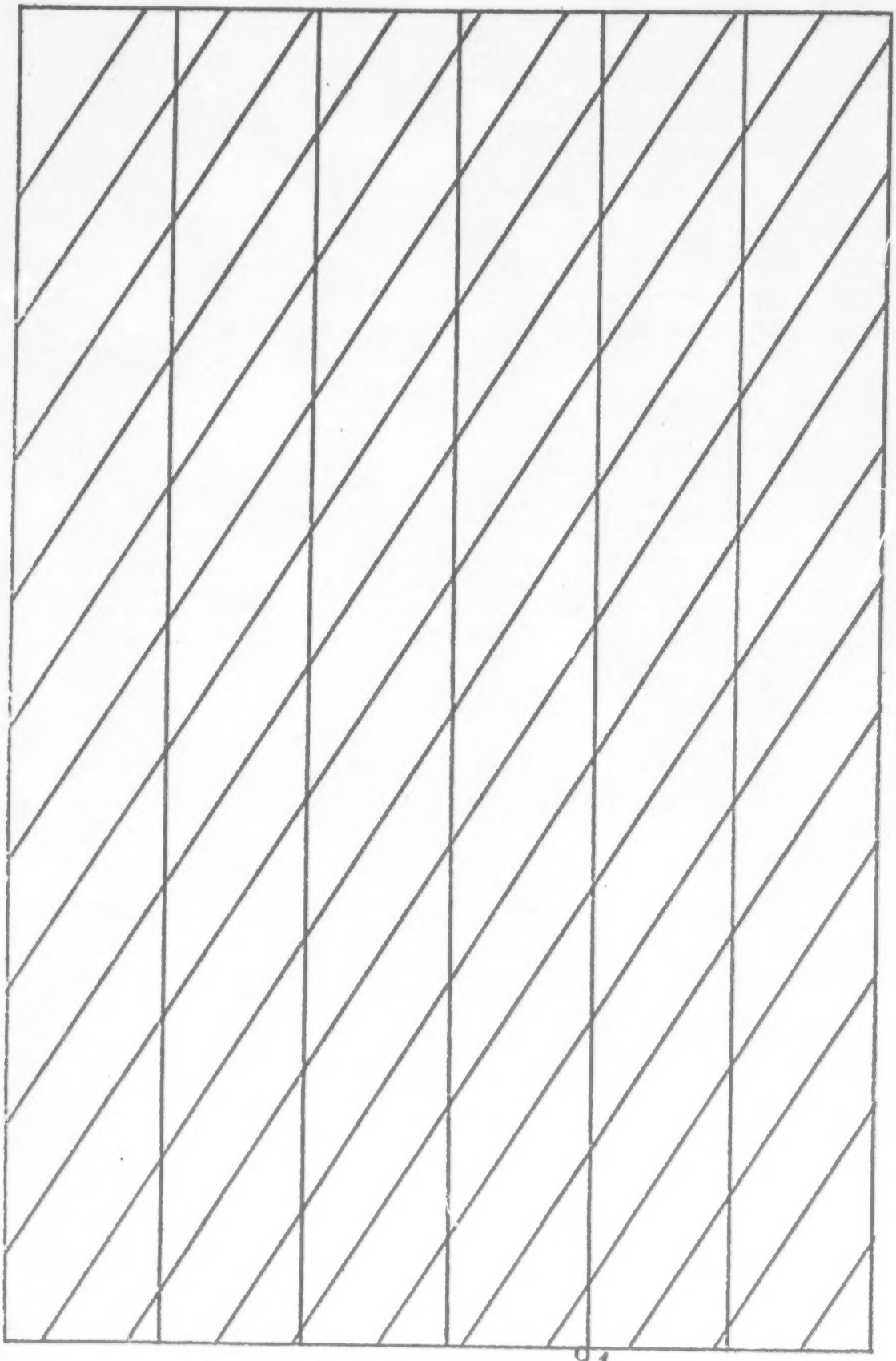
Stage 5: Two colour lines 5/16" apart.
Print between blue; up and down to red.

Stage 6: Two colour lines 1/4" apart.
Print or <u>write</u> between blue lines, use ascenders up to red and descenders down to red.

Stage 7: Single colour lines 5/16" apart.



Appendix D: Slant Guide Liner for Cursive Script



Grades 5-6
HANDWRITING SCORING SHEET

NAME _____ GRADE _____

Quality	Scores									
1. Good Size										
2. Correct Slant										
3. Even Spacing										
4. Even Line										
5. Good Loops										
6. Good Stems										
7. Roundness										
8. Neat Closings										
9. Proper Endings										
10. Proper Letter Form										
TOTAL										
DATE OF TEST										

MARKS: Excellent 5; Very Good 4; Good 3; Fair 2; Poor 1.

MY HANDWRITING CHART NAME: _____

	Print either yes or no in the space	Sept.	Nov.	Jan.	Mar.	May
1.	Capital letters are twice as large as small letters.					
2.	The differences among o's, c's, a's are clear.					
3.	The round parts of m's, n's and u's are clear.					
4.	Loops on f's, j's, g's, y's are clearly drawn below the line					
5.	Loops do not intercept writing on the lines above and below.					
6.	T's are crossed.					
7.	I do not use a circle to dot my i's.					
8.	Letters are not crowded.					
9.	Letters all slant in the same direction.					
10.	Words are separated by clearly defined spaces.					
11.	There are good margins.					
12.						
13.						
14.						
15.						

1. The more I smile at people
The more they smile at me

Score=30

2. The more I smile at people
The more they smile at me

Score=29

3. The more I smile at people
The more they smile at me

Score=20

Grade 5

1. Snow is out of fashion,
But it still comes down,
To whiten all the buildings
In our town;

Score=32

2. Snow is out of fashion,
But it still comes down,
To whiten all the buildings
In our town;

Score=32

3. Snow is out of fashion,
But it still comes down,
To whiten all the buildings
In our town;

Score=28

TEACHER INTERVIEW SCHEDULE

Background Information

1. What is your current position in the school?
2. For how many years have you occupied this position?
3. What do you feel is the role of handwriting instruction in the school curriculum?
4. How important do you feel this role is?
5. How much emphasis do you place on handwriting in your class? Why?

Handwriting Program

6. What types of commercial, teacher-prepared or other handwriting programs do you use in your class?

   Commercial Materials

   a) What is the name of the commercially prepared program?

   b) Why was this particular program chosen?

   Teacher-prepared Materials

   a) Who was involved in its preparation?

   b) What sort of process was involved?

   c) Why was it felt necessary for teachers to produce their own materials?

7. What specific instructional techniques are being utilized in your class?
8. What is the theoretical/empirical basis for these program activities?
9. Is an individual-instruction, group-instruction, or other approach taken? Why?
10. Are formal handwriting lessions given, or is instruction integrated with other parts of the program? Why?

11. How much time is devoted to handwriting instruction? (Per day/ per week)

12. What sort of evaluation procedures are used?

13. Are special provisions made for left-handed students?

14. Are there special handwriting programs for children with learning disabilities?

15. Are there programs of remedial handwriting in the school?

16. What disadvantages (if any) do you see in the existing handwriting program?

17. What do teachers need in order to provide better handwriting instruction? (training, materials, etc.)

Appendix H: interview Schedule for Students

STUDENT INTERVIEW SCHEDULE

STUDENT'S NAME _____

GRADE _____

TEACHER _____

SCHOOL _____

Have the student copy his/her name in the space below:

NAME: _____

☐ Right handed

☐ Left handed

Comments: _____

1. DO YOU ENJOY PRINTING/WRITING LESSONS? _____

What do you like most about them? _____

What do you like least about them? _____

2. DO YOU THINK THAT BEING ABLE TO WRITE NEATLY IS IMPORTANT? WHY? _____

3. HOW DO YOU FEEL ABOUT THE QUALITY OF YOUR OWN WRITING? _____

How do you think it could be improved? _____

4. WHAT DO YOU FIND MOST DIFFICULT ABOUT PRINTING/WRITING? (Letter forms, etc.)

5. WOULD YOU RATHER PRINT OR WRITE? WHY? _____

6. OTHER COMMENTS _____

Appendix I: Interview Schedule for Kindergarten Students

STUDENT INTERVIEW SCHEDULE ** KINDERGARTEN

STUDENT'S NAME _____

GRADE _____

TEACHER _____

SCHOOL _____

****

1. DO YOU KNOW ANY LETTERS OF THE ALPHABET? _____

   If yes, which ones? _____

   _____

   _____

   If yes, where did you learn them? _____

   _____

   _____

   _____

2. DO YOU KNOW HOW TO WRITE YOUR NAME? ☐ Yes ☐ No

   If yes, have the student print his/her name in the space below.

   Name: _____

   ☐ Right handed

   ☐ Left handed

   COMMENTS: _____

   _____

   _____

   _____

   _____

   _____

   _____

   _____

3. DO YOU THINK THAT IT'S IMPORTANT TO BE ABLE TO PRINT? WHY? _____

4. OTHER COMMENTS:

CLASSROOM OBSERVATION: HANDWRITING

School: _____

Grade: _____

Class: _____

Date: _____

I COMMERCIALLLY PREPARED MATERIALS

- ☐ used exclusively
- ☐ used in conjunction with teacher-prepared materials
- ☐ not used at all

Nature of the material used:

- ☐ student workbooks
- ☐ student worksheets
- ☐ teacher handbook
- ☐ alphabet models
- ☐ other _____

Name of publication _____

Publisher _____

Comments _____

_____

_____

II TEACHER-PREPARED MATERIALS

- ☐ used exclusively
- ☐ used in conjunction with commercial programs
- ☐ not used at all

Nature of the materials used:

- ☐ student workbooks
- ☐ student worksheets
- ☐ teacher handbooks
- ☐ alphabet models
- ☐ other _____

Comments _____

_____

_____

III OBJECTIVES OF THE LESSON

- ☐ writing readiness
- ☐ internalization of letter shapes (manuscript)
- ☐ internalization of letter shapes (cursive)
- ☐ letter formation exercises (manuscript)
- ☐ letter formation exercises (cursive)
- ☐ arm and hand movement
- ☐ postural considerations
- ☐ pen/pencil holding
- ☐ manuscript ---> cursive transition
- ☐ improvement of skill
- ☐ creative story writing
- ☐ other _____

Comments _____

_____

_____

IV INSTRUCTIONAL TASKS:

- ☐ games (gross motor)
- ☐ games (fine motor)
- ☐ drawing
- ☐ finger painting
- ☐ brush painting
- ☐ copying -- blackboard to paper
- ☐ copying -- paper to paper
- ☐ finger tracing
- ☐ tracing in the air
- ☐ tracing with pen/pencil
- ☐ faded tracing
- ☐ drill
- ☐ blackboard work
- ☐ creative writing
- ☐ homework
- ☐ other _____

Comments _____

_____

_____

V MATERIALS USED:

- ☐ games
- ☐ toys
- ☐ modelling clay
- ☐ paint
- ☐ crayons
- ☐ markers
- ☐ pens
- ☐ pencils
- ☐ fountain pens
- ☐ newsprint
- ☐ notebooks
- ☐ special writing paper
- ☐ other _____

Comments _____

_____

VI TEACHER AIDS

- ☐ blackboard
- ☐ overhead projector
- ☐ teacher handbook
- ☐ magnetic board
- ☐ other _____

Comments _____

_____

_____

VII NATURE OF THE LESSON

- ☐ formal lesson
- ☐ integrated with other parts of language arts program
- ☐ individual instruction
- ☐ class instruction
- ☐ other _____

Comments _____

_____

_____

VIII TIME

Time devoted to handwriting lesson = _____ min.

Comments _____

_____

_____

IX HANDWRITING EVALUATION

- ☐ teacher evaluation
- ☐ student self-evaluation
- ☐ in-class evaluation
- ☐ out-of-class evaluation
- ☐ no evaluation
- ☐ other _____

Comments _____

_____

_____

X STUDENT RESPONSE

- ☐ very interested
- ☐ interested
- ☐ somewhat interested
- ☐ not interested
- ☐ apathetic

Comments _____

_____

_____

XI SPECIAL INSTRUCTION FOR LEFT-HANDED STUDENTS

- ☐ postural considerations
- ☐ pen/pencil holding
- ☐ arm/finger movement
- ☐ paper position
- ☐ alternative models presented
- ☐ separate lessons given
- ☐ special materials
- ☐ left-handed desks
- ☐ special seating plan
- ☐ other _____

Comments _____

XII GENERAL COMMENTS

References

Books and Journal Articles

Anderson, Dan W. "What Makes Writing Legible?" *Elementary School Journal*, April 1969: 364-369.

Askow, Eunice; Otto, Wayne; Askow, Warren. "A Decade of Research in Handwriting: Progress and Prospect." *Journal of Educational Research*, November 1970: 100-111.

Barbe, Walter B., and Lucas, Virginia H. "Instruction in Handwriting: A New Look." *Childhood Education*, February 1974: 207-209.

Bell, Mary E. "Manuscript Writing After the Primary Grades." *Education*, September/October 1968: 81-83.

Berry, Winifred. "Italic Writing." *Education Digest*, April 1961: 50-51.

Briggs, Dennis. "The Influence of Handwriting on Assessment." *Educational Research*, November 1970: 50-55.

Campbell, Dorothy Drysdale. "Typewriting Contrasted with Handwriting: A Circumvention Study of Learning-Disabled Children." *Journal of Special Education*, Summer 1973: 155-168.

Carter, John L., and Synolds, Donald. "Effects of Relaxation Training Upon Handwriting Quality." *Journal of Learning Disabilities*, April 1974: 236-238.

Crawford, Patricia, and Brenner, Lynne. "The Results of a Preliminary Examination of Manuscript Versus Cursive Writing," Willowdale, Ontario: The North York Board of Education, Educational Research Services, 1972.

Cole, Luella. "Instruction in Penmanship for the Left-Handed Child." *Elementary School Journal*, February 1939: 336-448.

Croutch, Ben. "Handwriting and Correct Posture." *Academic Therapy Quarterly*, Summer, 1969: 283-284.

Diringer, David. *The Alphabet: A Key to the History of Mankind.* Volume I and Volume II. U.S.A.: Funk & Wagnalls, New York City, 3rd Edition, 1968.

Early, George H. "The Case for Cursive Writing." *Academic Therapy Quarterly,* Fall 1973: 105-108.

Enstrom, E.A. "The Decline of Handwriting." *The Elementary School Journal,* October 1965: 22-27.

Enstrom, E.A. "The Extent and Use of the Left Hand in Handwriting." *Journal of Educational Research,* February, 1962: 234-235.

Enstrom, E.A. "Myths About Manuscript Writing." *Education,* September/October 1969: 51-55. (a)

Enstrom, Erick A. "Out of the Classroom: Handwriting for the Retarded." *Exceptional Children,* February 1966: 385-388.

Enstrom, E.A. "The Relative Efficiency of the Various Approaches to Writing with the Left Hand." *Journal of Educational Research,* August 1962: 573-577.

Enstrom, E.A. "Those Questions on Handwriting." *Elementary School Journal,* March 1969: 327-333. (b)

Enstrom, Erick A. and Enstrom, D.C. "Practical Teaching Methods for Primary Handwriting Skills." *Academic Therapy Quarterly,* Spring 1972: 285-292.

Fairbank, Alfred. *The Story of Handwriting.* London: Faber & Faber, 1970.

Foerster, Leona M. "Sinistral Power! Help for Left-Handed Children." *Elementary English,* February 1975: 213-215.

Foerster, Leona M. "Teacher - Don't Let Your First Graders Trace!" *Elementary English,* March 1972: 431-433.

Furner, Beatrice A. "The Perceptual-Motor Nature of Learning in Handwriting" (Part 1). *Elementary English,* November 1969: 886-894.

Furner, Beatrice A. "Recommended Instructional Procedures in a Method Emphasizing the Perceptual-Motor Nature of Learning in Handwriting" (Part 2). *Elementary English,* December 1969: 1021-1030.

Furner, Beatrice A. "An Analysis of the Effectiveness of a Program of Instruction Emphasizing the Perceptual-Motor Nature of Learning in Handwriting" (Part 3). *Elementary English,* January 1970: 61-69.

Galaburda, Albert M.; LeMay, Marjorie; Kemper, Thomas L.; and Geschwind, Norman. "Right-Left Asymmetries in the Brain." *Science,* February 24, 1978: 852-856.

Glynn, E.L., Wotherspoon, A.T. and Harbridge, R. "Towards Self-Management of Generative Writing in the Special Class." *The Exceptional Child*, March 1976: 31-45.

Goleman, Daniel. "Special Abilities of the Sexes: Do They Begin in the Brain." *Psychology Today*, November 1978: 48-59; 120.

Gordon, L. Pearl, and Buell, Dorothy M. "Impact of Visual Motor Functioning upon Learning." *Journal of School Health*, June 1970: 301-303.

Groff, Patrick. "From Manuscript to Cursive - Why?" *Elementary School Journal*, November 1960: 97-101.

Groff, Patrick. "The Future of Legibility." *Elementary English*, February 1975: 205-212.

Harrison, Enid M. "The Brain-Damaged Child and Writing Problems." *Academic Therapy Quarterly*, Fall 1968: 13-21.

Havelock, Eric A. *Origins of Western Literacy*. Monograph Series/14. Toronto: The Ontario Institute for Studies in Education, 1976.

Herrick, Virgil E. "Children's Experiences in Handwriting." In *Children and the Language Arts*, eds. V.E. Herrick and L.B.Jacobs. U.S.A.: Prentice Hall, Inc., Englewood Cliffs, N.J. 1955: 266-287.

Herrick, Virgil E. *Comparison of Practices in Handwriting Advocated by Nineteen Commercial Systems of Handwriting Instruction*. U.S.A.: Committee on Research in Basic Skills, University of Wisconsin, Madison, Wisconsin, July 1960.

Herrick, Virgil E. *Handwriting and Related Factors 1890-1960*. U.S.A.: School of Education, University of Wisconsin, Madison, Wisconsin, 1963.

Hildreth, Gertrude. *Learning the Three R's*. U.S.A.: Educational Publishers, Inc., Minneapolis, Minn. 1947 Second Edition.

Hildreth, Gertrude. "Simplified Handwriting for Today." *Journal of Educational Research*, February 1963: 330-333.

Hirsch, Edward, and Niedermeyer, Fred. "The Effects of Tracing Prompts and Discrimination Training on Kindergarten Handwriting Performance." *Journal of Educational Research*, October 1973: 81-86.

Horton, Lowell Wayne. "An Analysis of Illegibilities in the Cursive Handwriting of 1000 Selected Sixth-Grade Students." Ph.D. dissertation, Ohio State University, 1969.

Horton, Lowell. "The Second R: A Working Bibliography." *Elementary English*, April 1969: 426-430.

Joseph, Florence, and Mullins, June. "A Script to Supplant Cursive Writing or Printing." *Teaching Exceptional Children*, Fall 1970: 23-24; 29-32.

Lahey, Benjamin B.; Busemeyer, Mary Kay; O'Hara, Christiane; and Beggs, Vicki E. "Treatment of Severe Perceptual-Motor Disorders in Children Diagnosed as Learning Disabled." *Behaviour Modification*, January 1977: 123-140.

Levine, Norman, and Carter, Joan. "Handwriting for the Learning Disabled." *Academic Therapy Quarterly*, Fall 1968: 35-38.

Levy, Jerre, and Levy, Jerome M. "Human Lateralization from Head to Foot: Sex-Related Factors." *Science*, June 16, 1978: 1291-1292.

Levy, Jerre, and Reid, Marylou. "Variations in Writing Posture and Cerebral Organization." *Science*, October 1976: 337-339.

Marshall, Jon C. "Writing Neatness, Composition Errors, and Essay Grades Re-Examined." *Journal of Educational Research*, January 1972: 231-215.

Neufeld, Karen. "Open Letter to a Right-Handed Teacher." *Language Arts*, September 1976: 668-669.

Markham, Lynda R. "Influences of Handwriting Quality on Teacher Evaluation of Written Work." *American Educational Research Journal*, Fall 1976: 277-283.

Niedermeyer, Fred C. "Kindergarteners Learn to Write." *Elementary School Journal*, December 1973: 33-36.

Ogg, Oscar. *The 26 Letters*. U.S.A.: Thomas Y. Crowell Co., New York City, 1961.

Otto, Wayne and Anderson, Dan W. "Handwriting." In *Encyclopedia of Educational Research*, The MacMillan Company, 1969: 570-579.

Plattor, Emma E., and Woestehoff, Ellsworth S. "Toward a Singular Style of Instruction in Handwriting." *Elementary English*, December 1971: 1009-1011.

Søvik, Nils. *Developmental Cybernetics of Handwriting and Graphic Behaviour*. Norway: Universitetstetsforlaget, Oslo, 1975.

Stennett, Richard G.; Smythe, P.C.; Hardy, Madeline; Wilson, H.R. "Developmental Trends in Letter Printing Skill." *Perceptual and Motor Skills*, 1972: 183-186.

Templin, Elaine, and King, Fred M. "Manuscript and Cursive Wrtiting." *NEA Journal*, 26-28.

Thomas, Aletha P. "The Developmental Process of Handwriting." *Academic Therapy Quarterly*, Fall 1968: 39-42.

Ullman, Berthold Louis. *Ancient Writing and Its Influence*. U.S.A.: M.I.T. Press, Cambridge, Mass., 1969.

Voorhis, Thelma G. *The Relative Merits of Cursive and Manuscript Writing.* New York City: Teachers College, Columbia University, 1931.

Wilson, Louis Ada. "Helping Children with Manuscript Writing." *Peabody Journal of Education,* September 1969: 72-76.

Witelson, Sandra F. "Sex and the Single Hemisphere: Specialization of the Right Hemisphere for Spatial Processing." *Science,* July 30, 1976: 425-427.

Wright, Jane P., and Allen, Elizabeth G. "Ready to Write!" *Elementary School Journal,* April 1975: 430-435.

Commercial Handwriting Programs

Alphabet Mastery; Level 1 - Manuscript, Level 2 - Cursive. Created by Enid L. Huelsberg. Published by Ann Arbor Publishers, Inc., Worthington, Ohio.

A Basic Writing Course. Level One to Level Eight. Created by C.E. Stothers and J.W. Trusler. Published by W.J. Gage Limited, Toronto. 1965.

Creative Growth With Handwriting, Kindergarten to Grade Eight. Second Edition. Created by Walter B. Barbe, Virginia H. Lucas, Clinton S. Hackney, and Constance McAllister. Published by Zaner-Bloser, Inc., Columbus, Ohio. 1979.

Cursive Tracking, Manuscript Tracking, and Letter Tracking. Published by Ann Arbor Publishers, Inc., Worthington, Ohio.

Mr. Muggs: Starting Points in Language Arts. Level One to Level Six. Published by Ginn & Company, Toronto. 1976, 1977, 1978.

PART II: HANDWRITING: AN ANNOTATED BIBLIOGRAPHY

In school, the ability of a child to perform curricular tasks is directly related to his capacity to manipulate written language through reading, spelling, and writing. It is not surprising, therefore, that the learning of alphabetic and numerical characters precedes all other major learning activities in the school curriculum. Because the child is not only required to read and interpret what others have written, but also to create a written statement himself, it is imperative that he be able to write in a legible manner, so that others can readily comprehend what he wishes to convey. For this reason, students have been required to master handwriting skills early in the educational program, although there is still much ambiguity as to what instructional techniques and writing styles produce the best results. Educators, for example are still undecided as to whether manuscript, italic or cursive script should be taught exclusively in school, or whether the current practice of switching from manuscript to cursive styles should be maintained.

This bibliography gives a listing of selected materials in the area of handwriting instruction and research, and provides an abstract for each book and article included. In no way does it exhaust all currently relevant publications in the field; however, it does attempt to include works from all facets of the handwriting literature. All bibliographic entries are numbered consecutively throughout the text. An author index is provided.

HISTORY OF HANDWRITING

Although we tend to take for granted the ability to communicate through alphabetic characters, the development of the existing Latin alphabet took many hundreds of years, beginning with crude picture symbols scratched on cave walls, and slowly evolving into twenty-six symbols representing discrete sounds. The following entries deal with a history of handwriting, and outline the many stages that symbol writing has undergone. Several entries deal with the development of handwriting styles as well as the evolution of alphabetic characters.

1. Diringer, David. *The Alphabet: A Key to the History of Mankind* Volume I and Volume II. U.S.A.: Funk & Wagnalls, New York City, 3rd Edition, 1968.

This two-volume set explores the origins of symbolic visual communication in prehistoric times, and traces its development to the creation of our modern world alphabets. The first type of writing consisted of scribbling on stone, but later developed into more detailed drawings, known as 'pictography.' As symbols became more simple and abstract, 'ideographic' writing began to emerge, whereby a sequence of events could be easily portrayed through a sequence of compact characters. In time, symbols began to be used for sounds or syllables, instead of for objects or concepts, and paved the way to the development of the modern alphabet which assigns a different letter for every discrete vowel and consonant sound. Several theories of alphabetic origin are explored, including a discussion of the influence of the South Semitic, Greek, Eutruscan, Italic and Latin alphabets. In addition, the nature and importance of major world writing systems are described in detail, ranging historically from the time of Sumerian cuneiform and Egyptian hieroglyphics to the Latin alphabet currently in use. Each section of this work is followed by a bibliography of related texts. Volume two consists solely of illustrations depicting writing styles throughout history.

2. Fairbank, Alfred. *The Story of Handwriting.* London: Faber & Faber, 1970.

Traces the development of handwriting from its beginning (Sumerian cuneiform, Egyptian hieroglyphic, heratic and demotic scripts) through the development of the Latin alphabet (Phoenician, Minoan, Greek, and Eutruscan influences) to later scripts based on the Latin alphabet (majuscules, miniscules, uncials and half-uncials). During the Renaissance in the fourteenth century many older writing styles were revived, such as the Caroline style first introduced in the era of the Holy Roman Empire, while various writing guides presented new styles, which eventually became the basis for most modern type faces. Later, cursive script became more popular, and eventually replaced all others, as the dominant writing mode. Loops became fashionable, as did the ability to write without lifting the pen from the paper, thereby producing a beautiful flowing hand. Copy books, such as George Beckman's The Universal Penman (1733-1741), were introduced

in order to enhance writing ability. John Jackson's The Theory and Practice of Handwriting (1892) was critical of the diversity of slant, and advocated a vertical style. Edward Johnston (1913) introduced simplified letter forms for teaching beginning writers and to help children learn to read. By 1916, experiments in this print or manuscript style began in London, and gradually spread to other countries. In 1921 Marjorie Wise introduced manuscript to the United States, where it has been used ever since. The author comments on current writing practices in the mid-twentieth century and suggests that an italic hand be used more extensively since it would overcome the speed obstacle of the manuscript style, while producing a highly legible and rapid hand.

3. Gray, William S. *The Teaching of Reading and Writing.* France: UNESCO, Paris, 1956.

Three chapters deal specifically with handwriting instruction and cover such topics as the historical development of current writing practices, methods of cursive and manuscript writing instruction for children and adults, and the diagnosis and remediation of illegible writing styles. Early handwriting techniques emphasized both form and quality, with much school time devoted to the development of an artistic style. Reforms around 1850, however, began to emphasize muscular movement in order to create a more flowing or fluent script. Since 1900, a print or manuscript form has gained in popularity because of its simplicity and similarity to the printed text. Current practices involve the teaching of print script in grades one and two, and then switching to the more rapid cursive form in grade three. The text considers many aspects of current handwriting instruction, such as writing style, instruments and materials, body posture, hand positioning, handedness and evaluation of legibility.

4. Havelock, Eric A. *Origins of Western Literacy.* Monograph Series/14. Toronto: The Ontario Institute for Studies in Education, 1976.

Traces the development of the alphabet and literacy from its origins to present day. It is suggested that the societies of Greece and Rome are the first in history that could truly be called literate

because the ability to read and write was found in a large segment of the population rather than being restricted to a small group. Societies existing prior to this era should not be thought of as illiterate as the term is used today, but pre-literate, insofar as a complex oral tradition was used to pass on cultural information instead of the written word. Today, to be illiterate is to have access to neither a written nor an oral tradition. One should not equate written language with spoken language, since the human capacity for both is not the same. It is claimed that the ability to speak is a biological characteristic of man which has been acquired through a process of natural selection. Although many can now read and write, this faculty is new in terms of man's biological development. It should not be surprising, therefore, to see many individuals who have difficulty learning reading and writing skills; the biological ability is simply not present in anyone's genes.

Although symbols depicting the events in man's life have been in existence since cave dwellers 'wrote' on stone walls, a true alphabet to convey complex information is a recent accomplishment. Three theoretic requirements for a true alphabet have been outlined in the text and are as follows: (1) coverage of all the phonemes (i.e., the minimum acoustic constituents) in the language must be exhaustive; (2) the letter shapes must be restricted to between twenty and thirty for easy recall; and (3) individual letter shapes must not be required to represent several sounds; their acoustic identities must be fixed and unchanging. The Greek alphabet, later adopted by the Romans, satisfy all three conditions. All previous writing systems failed on one or more of these conditions. The Semitic alphabet, for example, left wide interpretation for many symbols, thus failing to satisfy the third requirement. Because early alphabets were often ambiguous, a poetic style was typically used, thus limiting the interpretation that a reader could place on the symbols. It is claimed that the Greeks not only invented the alphabet, but also literacy and the literate basis of modern thought. Only when an unambiguous writing system was available to large numbers of people, could the age of true literacy begin. After the invention of the alphabet, the next most important determinant of

mass literacy was the invention of paper and the printing press, which gave a standardized and legible writing style to supersede the unique scribal style created more or less by the whim of the writer/copier.

5. Kuipers, Joan, and Ricco, Mary, Lou. "From Graphomania to Graphophobia and Halfway Back." *Elementary English*, February, 1975: 216-220.

   A fictional history of handwriting from the era of the cave dweller to modern-day mass communication, showing the importance of handwriting as a means of conveying cultural and personal information.

6. Ogg, Oscar. *The 26 Letters*. U.S.A.: Thomas Y. Crowell Co., New York City, 1961.

   A description of alphabetic development from prehistoric to modern times. The first symbolic representations are said to have been drawings on cave walls, made in Northern Europe over 600,000 years ago. These 'thing pictures' showed an evolutionary development from still life pictures of animals and humans to a series of action pictures telling stories about events in the life of the artist. The next stage of development occurred when simplified symbols, instead of detailed pictures, were used to represent objects. This enabled the writer to add more detail, since less time was required to create each picture representation. Because 'thing pictures' could not convey feelings, a series of 'idea pictures' were also developed. For example, by combining the symbols for mouth and water, one created a representation for 'drink'. Another advancement was the use of 'sound pictures', where objects represented syllables instead of the objects themselves. (For example, the combined symbols for 'hot' and 'dog' could yield a totally new concept of 'hotdog', which has nothing to do with the constituent words, but which nevertheless sounds like the combination of both terms.) The Egyptian hieroglyphics used all three types of picture writing. It was the Phoenicians who are credited with the creation of the first true alphabet, through their allocation of unique symbols for discrete sounds. Greek scholars made further improvements on the Phoenician alphabet by including symbols for vowels. Prior to this time, it was up to the reader to decide where a vowel sound was intended in a word and which one was needed. The

sort of text created by the Phoenicians was therefore a type of abbreviated writing. The Romans refined the Greek alphabet by improving letter shapes, and hence legibility, and were ultimately responsible for its utilization in much of the civilized world. In the Dark Ages the art of handwriting would have been lost if scholars and monks in isolated monasteries had not copied religious and secular documents. When the Holy Roman Empire emerged under Charlemagne, handwriting was again revitalized through the influence of Alcuin, the developer of the 'small' or Caroline letters, which are still in use today. The introduction of the printing press made it possible for greater numbers of people to become literate, and hence the ability to write also increased. With the printed text came more standard letter forms which were eventually adopted throughout most of the European nations.

7. Ullman, Berthold Louis. *Ancient Writing and Its Influence.* U.S.A.: M.I.T. Press, Cambridge, Mass., 1969.

Traces the development of handwriting from pictographic representations in antiquity to modern alphabetic forms used in current printing and writing practices. The first type of alphabet, employing symbols representing sounds instead of concepts (as in pictograms), is said to have been Semitic. However, some argue that this type of script could not be called truly alphabetic because its characters were syllabic or semi-syllabic in nature, rather than representing discrete sounds. It was the Greeks, therefore, who are said to have created the first true alphabet of this latter type, with modifications and improvements made by the Romans. The nature of the writing materials available throughout history has had an enormous influence on the style of writing produced. Chiseling in stone in the earliest days led to the use of straight lines, while the movement to pen and ink on papyrus or parchment led to the development of a more flowing circular form. As more and more people learned to write, a rapid cursive script with joined letters evolved, in addition to the exacting, laborious formal script used to record permanent text. In time, this informal script greatly influenced the formal script, promoting greater simplicity in letter formation. With the introduction of printing

techniques in the fourteenth century, greater uniformity in writing style was made possible so that by the sixteenth century, the Latin alphabet had spread across most of Europe and became the standard printing form in most countries. Today, we continue to use a simplified form of the Latin script which displays the evolutionary influences of both the Greek and Roman alphabets of the past.

DEVELOPMENTAL ASPECTS OF HANDWRITING

Since the handwriting task involves both perceptual and motor elements it is essential that the child attain an appropriate level of psychomotor and visuo-spatial development before certain handwriting processes are begun. The following bibliographic entries deal with several aspects of child development, such as visual-motor coordination, cybernetic feedback processes, and kinesthetic imagery, which relate directly to successful handwriting performance.

8. Furner, Beatrice A. "The Perceptual-Motor Nature of Learning in Handwriting" (Part 1). *Elementary English*, November 1969: 886-894.
The author points out that written expression and handwriting skill are not innate abilities but sensory-motor skills which the child must develop through experience and practice. It is further indicated that most current handwriting exercises stress the motor aspects of the task while neglecting the perceptual aspects. For this reason, an examination of perceptual learning concepts was undertaken by the author in order to provide an instructional basis for handwriting tasks. Ten perceptual aspects of writing were uncovered as a result of this examination and are summarized as follows: (1) perceptual ability is learned; (2) perceptual ability is developmental; (3) mental set or motivation influences development of perception; (4) perception is built on several exposures to the stimulus; (5) movement, or the inferred movement of the object is an important aspect of perceptual development; (6) the use of terms to differentiate minor differences can aid perceptual development; (7) perceptual ability can be improved through frequent practice and training; (8) reinforcement through correction aids perceptual development; (9) training in very closely related perceptual activities has a greater transfer effect than in less closely related ones; and (10) various modes or types of stimulus have greater effectiveness for various people but perceptual development is increased through the use of many different types of stimulus in a given situation. Furner attempted to take these ten perceptual aspects of handwriting and create a program of instruction which stressed perceptual training in addition to motor skill development. This program is outlined in a second paper by Furner, entitled "Recommended Instructional Procedures in a Method Emphasizing the Perceptual-Motor Nature of Learning in Handwriting."

9. Furner, Beatrice A. "Recommended Instructional Procedures in a Method Emphasizing the Perceptual-Motor Nature of Learning in Handwriting" (Part 2). *Elementary English*, December 1969: 1021-1030.
The author describes instructional procedures for a handwriting program which emphasizes both the perceptual and motor aspects of the writing task. It is claimed that such instruction should

attempt to build accurate perception of the procedures involved in letter formation and to begin motor development prior to extensive use of the letter forms, in order to preclude the development of inaccurate perceptions and motor habits. Under her scheme, children are made aware of a need to know the correct procedures involved in all phases of the handwriting act, such as writing position, letter formation, alignment, spacing, and line quality. In order to aid in this perception, verbal descriptions of the process are required since in order to verbally describe the letter shapes, the child must know which stroke to make first, where to begin the stroke, and the direction, size and stopping point of the stroke. The paper goes on to describe (in detail) perceptual-motor programs of handwriting suitable for the first three grades.

10. Furner, Beatrice A. "An Analysis of the Effectiveness of a Program of Instruction Emphasizing the Perceptual-Motor Nature of Learning in Handwriting" (Part 3). *Elementary English*, January 1970: 61-65. This is the third in a series of articles by the author describing instructional programs in handwriting which emphasize both the perceptual and motor aspects of the writing task. The basic exercises used in the program include letter formation and perception through guided examination of the (letter) formational process, verbal descriptions of letter construction, self-analysis of errors, and attempts to describe (verbally) areas for improvement. In order to see whether the emphasis on perception has positively affected the quality (i.e., speed, legibility, and formational errors) of the students in the program, a comparison was made between the handwriting of students in the experimental group and a second group (control) of students who received an equal amount of instruction with a commercially prepared handwriting program, stressing motor development only. The results of the study showed that the overall quality of writing in the experimental group was higher, the speed was faster (though not statistically significant), and the rate of error in letter formation was lower. Because of these preliminary findings, it was concluded that the experimental method was more effective in developing accurate perceptions of of handwriting procedures to serve as a guide to motor development, thus producing better handwriting.

11. Gordon, L. Pearl, and Buell, Dorothy M. "Impact of Visual Motor Functioning upon Learning." *Journal of School Health*, June 1970: 301-303.

The authors claim that "timing" is an important factor in human learning, and is contingent upon an optimum interrelationship of the maturity of the individual and his hierarchy of acquired habits. However, they suggest that timing has been seriously overlooked, and hence, often misunderstood, in the visual-motor functioning of children, which is essential for success in both reading and writing tasks. The article indicates that many American children entering kindergarten programs lack extensive visual-motor experience in the home situation, possibly due to the amount of time spent passively before a television set. Hence extensive reading and writing readiness programs entailing visual-motor coordination exercises must be included in preschool programs.

12. Hildreth, Gertrude. *Learning the Three R's*. U.S.A.: Educational Publishers, Inc., Minneapolis, Minn. 1947 Second Edition.

Four chapters deal specifically with handwriting considerations for elementary school students. Hildreth suggests that learning to write is not a mechanical lower-level reflex response, but a thinking process which entails activity of the cortical nerve areas, in addition to motor coordination of eye, hand, arm and finger muscles. Writing from memory demands the internalization of visual and kinesthetic images of form, not present in the senses, for future recall. Once the discrete letter shapes and complex muscle movements required to form letters and words have been internalized by the individual, an automatic writing response will arise, whereby one is no longer required to think about the writing act itself, but can concentrate solely on the message to be conveyed. The author focuses on the developmental aspects of the handwriting act and its relationship to the oculomotor coordination, perceptual skill, interest, and motivation of the child. From infancy onward, muscular development proceeds in a downward direction from the head and shoulders to the fingers and becomes increasingly refined. Instruction in handwriting, therefore, must take into account the physique, characteristics, personality, age, mentality and perceptual maturity of the writer in the early stages of learning. In order to

increase interest and motivation in the young writer, instruction should also be linked up to content that is meaningful to the child.

13. Kavanagh, James F., and Mattingly, Ignatius, G. (Eds.) *Language by Ear and by Eye: The Relationship Between Speech and Reading.* U.S.A.: MIT Press, Cambridge, Mass. 1972.

Proceedings of a conference on "The Relationships Between Speech and Learning to Read," sponsored by the U.S. National Institute of Child Health and Human Development. Although the papers presented at the conference approach the problem of reading from a variety of directions, they all share the belief that the process of reading is directly related to the ability of a child to comprehend and use speech effectively. Speech here typically refers to auditory output, but may also refer to sign language on the part of a deaf child. Gibson explores the relationship between a child's initial babbling as a means of developing his vocal apparatus and vocabulary, and his initial scribbling as a means of developing his visual faculties for reading. Although he concludes that there may be similarities in phonology and orthography, the related processes are believed to be quite different in the human brain. Stevens points out that while learning to understand speech involves hearing oneself talk, learning to read need not involve seeing oneself write. Cooper suggests that a key difference between speech and reading lies in the fact that speech is an innate ability in all normal children whereas the capacity to master a written language must be systematically taught, if the child is to learn the necessary skills involved. Almost everyone acquires speech, but not everyone learns to read and write properly. Much emphasis is placed on the Analysis-by-Synthesis (ABS) model of speech recognition proposed by Stevens and Halle. According to this model, speech input must be systematically analyzed by the individual in such a manner that the component parts of the acoustic signal are matched with previously internalized acoustic signals stored in the individual's memory. If the string of sounds is matched successfully, then a meaningful sequence results. If not, a new hypothesis as to what the auditory string means is generated, again using the internalized acoustic signals and complex set of rules to produce the appropriate match. Klima explores several aspects of an optimal orthography which

would make the transition from speech to written language easiest for a child. Essentially, he claims that the closer the match between orthographic representations and the linguistic form, the easier it will be for an individual to acquire the ability to comprehend written language. Several papers are directly concerned with how alphabetic representations on paper take on meaning in an individual's brain. Posner, Lewis and Conrad, for example, suggest that two separate processes may be involved. First, visual alphabetic representations must be recognized by the individual and matched up with previously internalized visual codes. Once this is done, a secondary "naming" process makes sense of the string of alphabetic characters. Proof for this two-stage process is said to lie in the fact that the right hemisphere of the brain has been shown to be responsible for deciphering physical codes (for alphabetic representations), while the left hemisphere is responsible for the name codes which give meaning to those physical codes. Conrad, however, questions whether one must read, say the word (internally), listen to what was said, and then understand, or if one can get meaning directly from the visual code in a one-step process. Based on extensive research with deaf children, he concludes that reading is possible even without phonology, but that the task is much easier if phonology is involved. Savin explores some of the methodologies used in teaching a child to read. Basically the child is taught either (1) letter sounds which it must merge together to form words; (2) complete word recognition, so that individual letters are not emphasized; or (3) basic sounds associated with syllables or letter groupings. It is pointed out that no foolproof method has yet been found for the successful teaching of reading.

14. Søvik, Nils. *Developmental Cybernetics of Handwriting and Graphic Behaviour*. Norway: Universitetstetsforlaget, Oslo, 1975.
Explores the psycho-motor aspects of children's handwriting from the perspective of Cybernetic Feedback Theory. Here, handwriting is defined as 'an educational, psycho-motor skill, initially processed by perceptual-cognitive functions and carried out through the psycho-motor system as an instrumental behavior, conveying a graphic record as the product of that behavior.' According to the Cybernetic Feedback Theory, self-generated body tracking mechanisms

operate within an individual to monitor muscle action and to ensure that the desired action (originating in the brain) is the one which is ultimately carried out by the appropriate muscular group. In this way, feedback information constantly directs muscular movement towards the desired target by comparing the actual motion with the desired motion, and then adjusting errors accordingly. In the case of handwriting, three forms of feedback are thought to come into play: (1) reactive feedback or visual and kinesthetic information received about arm and hand movements; (2) instrumental feedback or visual and kinesthetic information about the pen's movement; and (3) operational feedback or visual information about the graphic pattern formed in ink on the paper. In the case of an experienced writer, a 'feedforward control mechanism' is also believed to operate. Here, the individual anticipates the desired letter shapes from his mental repertoire and uses this information to direct hand motion in advance of the actual pen movements on the paper. This anticipation of future hand motion increases the possibility of coordinating expected hand movement, and hence promotes a rapid writing style. Writing readiness is seen to be extremely important for the successful acquisition of basic handwriting skills. It is suggested that a first step in learning to print or write is to engage in tracing or copying the many letter shapes. Copying is believed to be an important vehicle for coordinating visual and motor aspects of the handwriting act, which is essential if the basic letter shapes are to be internalized for immediate transference from mental images to muscular movements which will duplicate the letters graphically. The text also presents the results of a multi-faceted study by the author, which explores several psycho-motor aspects of children's handwriting. By comparing groups of sixty children aged seven, nine and eleven on the basis of psycho-motor and handwriting tests, he was able to plot developmental trends in both psycho-motor abilities in the children, and in their handwriting skills in particular. He found that both psycho-motor and writing skills developed at a much faster rate between chronological age seven and nine, than between chronological age nine and eleven. The similar developmental curves evidenced for both general psycho-motor development and the specific handwriting skills suggested that handwriting ability must follow the individual

child's pattern of psycho-motor development. Although girls were seen to perform better than boys in terms of legibility and overall writing quality, no difference between the sexes in terms of writing speed was evidenced. The quality differences were seen to originate from motivational factors rather than from any inherent male/female characteristics. With regard to the theory of cybernetic feedback, it was hypothesized that 'space' was the most important aspect of neurogeometricity in both copying and handwriting motion. For this reason, the laboratory studies were designed to clarify the relationships between the feedback control systems and the space dimensions of the copying/writing motion patterns. It was hypothesized that 'an average higher accuracy score and a lower frequency of letter deterioration would occur in shorter than in longer letters, in simple than in complex letters, in separate than in combined letters, and in print than in cursive writing style.' These hypotheses were all confirmed by the writing tests administered to 128 children, and indicated that letters or words characterized as short and simple models are more resistant to deterioration than long and complex forms. In other words, the simplest letter shapes are the ones most easily handled by the self-generating feedback mechanisms of the child.

15. Stennett, Richard G; Smythe, P.C.; Hardy, Madeline; Wilson, H.R. "Developmental Trends in Letter-Printing Skill." *Perceptual and Motor Skills*, February 1972: 183-186

This study was designed to assess the development of a student's ability to copy upper and lower case letters in a recognizable form. Printing tests were administered to 200 students in kindergarten and grade one, two and three classes at a public school in London, England. Scoring was based on ease of identification of letters by the examiner without knowledge of the stimulus letter. The percentage of students able to reproduce each letter was calculated for the four grade levels, with separate intercorrelation matrices for the 26 upper and lower case letters for the two youngest age groups. It was found that: (1) students were still having difficulty copying lower case letters at the end of grade three; (2) students mastered upper case letters by the end of grade two; (3) students had less difficulty copying lower case letters which were relatively simple (e.g., o, c, l, s), but had

more difficulty with letters requiring more than one stroke and greater psycho-motor and visual skills (e.g., r, u, h, t); and (4) upper case letters O, E, H, and I were easiest to master, while D, Z, G and N were more difficult.

16. Thomas, Aletha P. "The Developmental Process of Handwriting." *Academic Therapy Quarterly*, Fall 1968: 39-42.
The author claims that the developmental aspects of the handwriting task cannot be overemphasized, and urges teachers to withhold instruction in handwriting until it is clear that the child is adequately developed, neurologically, emotionally, and psysiologically. It is said that written communication is the least necessary tool in the early years of a child's school life, yet it remains the most pressed-for and most demanded skill.

17. Trester, Mary Fran. "Sequence for the Training of Eye-Hand Coordination Needed for the Organization of Handwriting Tasks." *Special Education in Canada*, March 1971: 17-22.
The author is concerned with the inability of many elementary school children to organize handwritten work properly, by running words together, failing to write on the line, leaving words out and mis-spelling in copying exercises, and so forth. She claims that these children lack the fine motor control and eye-hand coordination needed to successfully complete handwritten work, due to a lack of adequate visual-motor exercises prior to handwriting instruction. To further refine their motor development, it is suggested that several gross and fine muscle exercises, such as making angels in the snow, throwing balls at a target, performing chalkboard work, etc., be initiated by the teacher. Throughout the activities, the child's attention should be drawn to concepts of direction, the relation of parts to a whole, and size and shape, so that he can integrate spatial concepts with the appropriate muscle action. Such knowledge is said to be essential for the successful completion of the handwriting task.

18. Wright, Jane P., and Allen, Elizabeth G. "Ready to Write!" *Elementary School Journal*, April 1975: 430-435.
Looks at the developmental aspects of writing readiness and warns that if a child is required to perform tasks which he is unprepared for developmentally, then unsatisfactory habits may be formed which could prove detrimental to proper task performance at a later point in time.

As is the case in all educational pursuits, teaching handwriting to children can be achieved in a variety of ways. Entries in this section of the bibliography are concerned with either general instructional strategies or specific techniques for handwriting programs, and include suggestions for appropriate body posture, hand position, writing instrument and materials, integration with other aspects of the language arts program, tracing and copying exercises, sequencing of instruction, sinistral-dextral differences, and so forth.

Although several authors claim that their approaches have produced great improvements in writing speed and/or quality, it has not been demonstrated that there are any fool-proof techniques which produce excellent results. Teachers are advised to use those approaches with which they are most comfortable, and which are appropriate for their students, complementing the learning experiences in the remainder of the school program.

19. Barbe, Walter B., and Lucas, Virginia H. "Instruction in Handwriting: A New Look." *Childhood Education*, February 1974: 207-209.
Claims that current problems of illegibility among school children result from a failure of teachers to teach the mechanics of handwriting. Extensive formal instruction in letter formation is said to work if it is related to a child's level of psychomotor development and made relevant to his own interests. Practice does not necessarily make perfect, and patterns requiring endless repetition of a single letter, out of context, result in acute boredom with the handwriting task and possibly lower levels of legibility as the practice continues.

20. Bauman, Toni, and Horton, Lowell. "Is Teaching Handwriting Really Important?" *Instructor*, January 1973: 68-69.
Claims that many children are currently frustrated in their attempts to master handwriting because of the difficulty of the task and the unimaginative approach taken by many teachers to develop this skill. Writing tasks should be interesting and made relevant to the experiences of the child. Several activities with overhead projectors, paper letters, paint brushes, water and chalkboards are outlined as possible approaches that can be taken to handwriting instruction.

21. Croutch, Ben. "Handwriting and Correct Posture." *Academic Therapy Quarterly*, Summer 1969: 283-284.
Basic difficulties in handwriting are often said to centre around improper body posture. This article gives general advice on posture and paper position for dextral and sinistral writers. For right-handed children, the bottom left corner of the paper should point to the navel, while for left-handed children the lower right corner should point to the navel. The non-dominant hand should rest on the bottom half of the paper to ensure an unobstructed visual field, and good body balance, which promotes muscle relaxation for a flowing hand. The elbow and forearm should rest on the writing surface, and the feet should be kept flat on the floor. The body should be slightly turned to the non-dominant hand side and the eyes kept approximately 16 inches from the paper. Ideally, the writing surface should be inclined towards the writer at an angle of 20 degrees from the horizontal.

22. Enstrom, E.A. "Homemade Handwriting." *Education*, November/December 1970: 135-137.

Claims that schools which develop their own handwriting programs invariably produce poor writers because of the unfamiliarity of the program developers with current research results, relevant theory, and acceptable methods of instruction. In place of much pending of energy on program development, it is suggested that greater emphasis be placed on in-service training for teachers, on the proper use of existing commercially prepared methods (which in the author's opinion, are typically of good quality, since their creators are expert in this field). Unless it can be shown that locally produced handwriting programs have an advantage over previously existing programs, then there is really no point in producing them.

23. Enstrom, Erick, A., and Enstrom, D.C. "Practical Teaching Methods for Primary Handwriting Skills." *Academic Therapy*, Spring 1972: 285-292.

Some very general advice for teaching handwriting to elementary school students: keep letter forms simple, use lined paper to ensure uniformity, and permit slanted printscript because it is more natural and is easier to create than vertical printed script.

24. Enstrom, E.A. "Th se Questions on Handwriting." *Elementary School Journal*, March 1969: 327-333.

The author suggests that cursive handwriting was not a deliberate invention, but an evolution of discrete symbols and letters into a continuous script in an attempt to provide a faster and more flowing writing form. He further suggests that if cursive handwriting is not taught to school children, then they will create a form of joined script on their own, which will probably not be as efficient as the cursive script taught in school. It is claimed that handwriting instruction should not be integrated with reading, spelling, or creative writing, since handwriting is a motor skill requiring drill and practice, whereas reading and creative writing require cognitive skills. In such a combination of cognitive and motor skills, the intense concentration necessary for the cognitive output causes the mechanics of the writing act to suffer. Hence, it is concluded that handwriting should be practised independently of other aspects of the language arts program.

25. Foerster, Leona M. "Teacher - Don't Let Your First Graders Trace!" *Elementary English*, March 1972: 431-433.
Claims that activities requiring children to trace alphabet letters do more to establish bad handwriting habits (in terms of proper letter formation), than to improve writing ability. When a child is required to trace over a dotted outline, his/her attention becomes centred on covering the line, rather than considering the correct starting point or the proper sequence of strokes. Since it is impossible for teachers to supervise all students completing the tracing exercises, it is recommended that this practice be abandoned. The author is also critical of 'sky-writing' or 'writing in the air,' because it fails to develop either visual skill or the coordination of the small muscles in the hand, which practice exercises should do. Because there is no record of the child's movements in 'sky writing,' it is difficult for the teacher to know if the letters have been formed properly. Hence, it is recommended that this practice also be abandoned.

26. Herrick, Virgil E. "Children's Experiences in Handwriting." *Children and The Language Arts*, Eds. V.E. Herrick and L.B. Jacobs. U.S.A.: Prentice Hall, Inc., Englewood Cliffs, N.J. 1955: 266-287.
Talks generally about handwriting programs currently used in the elementary schools of the United States. The author describes major devices used as aids in handwriting instruction for American children as well as special techniques for helping the left-handed writer. Studies conducted by the author found that children are usually expected to master numerals before letter shapes, although numbers are typically introduced after the upper and lower case alphabetic characters.

27. Hirsch, Edward, and Niedermeyer, Fred. "The Effects of Tracing Prompts and Discrimination Training on Kindergarten Handwriting Performance." *The Journal of Educational Research*, October 1973: 81-86.
This study was designed to investigate the effects of two kinds of letter formation practices and a form of letter-discrimination exercise on the handwriting performance of kindergarten children. The two letter-formation practices used were: (1) traditional copying, and (2) faded tracing, where letter shapes formed with

dots were given to students to trace, with dots representing the last strokes of the letter being removed successively during practice. By the eighteenth (out of 24) tracing trials, all dots were removed and the child was therefore engaged in a pure copying exercise. The letter discrimination exercises required the child to spot misformed letter shapes. Sixty students were randomly assigned to one of four test groups: (1) copying only, (2) faded tracing only, (3) copying and letter discrimination training, and (4) faded tracing and letter discrimination training. Each group was given the appropriate instruction for four days per week for ten weeks with sessions lasting from twenty to twenty-five minutes. Pre- and post-tests measured the quality of letters formed by the student, and his ability to discriminate among misformed and properly formed letter shapes. Using a two-way analysis of variance, a significant type-of-practice main effect was found in favor of the copying treatments over the faded tracing treatments; however, the discrimination training was not seen to differently affect the handwriting of either the copying or faded tracing groups. The authors concluded that "contrary to the anticipated outcome, subjects who formed letters solely in response to copying stimuli performed significantly better on the letter formation post-test than subjects who formed letters in response to copying stimuli and gradually faded tracing prompts."

28. Krzesni, Joseph S. "Effect of Different Writing Tools and Paper on Performance of the Third Grader." *Elementary English*, November 1971: 821-824.

Describes a study which attempted to determine whether the use of felt-tipped pens (as opposed to pencils and ball-point pens) had any advantageous effects on the handwriting performance of third-grade students. It was hypothesized that students would perform better in terms of writing legibility with felt-tipped pens. After analyzing the handwriting samples of 120 students, using the three types of writing tool, the author found that both felt and ball-point pens produced more legible handwriting in third-grade students than did lead pencils, although there was no noticeable difference between the felt and ball-point pens. It was also hypothesized that students would perform better on ruled rather

than unruled paper. This hypothesis was not confirmed. The results are said to be important in light of the fact that most schools currently provide pencils for grade three students and insist that they be used for all handwriting tasks.

29. Leavitt, Jerome E., and Hein, Frances Sigborn. "My Mother Writes Terrible." *Elementary School Journal*, November 1969: 74-78.
The author points out that just as many adults are poor writers as are children, yet adults are not punished and ridiculed, while children in school are made to feel inadequate. He suggests that, as educators, we know very little about how to teach handwriting successfully, and that poor handwriting is as much our problem as it is a problem for the child. Teachers should become as familiar as possible with current research and instructional techniques, and then use an eclectic approach to determine which program works best for them and for each individual child.

30. Niedermeyer, Fred C. "Kindergarteners Learn to Write." *Elementary School Journal*, December 1973: 33-36.
Assessment of a handwriting program for kindergarten students designed by the Southwest Regional Laboratory for Educational Research and Development in Los Alamitos, California. The program, consisting of 90 exercises of 25 minutes duration, concentrated on letter formation through tracing and copying tasks. A study of the effects of the program was carried out by having a control and an experimental class in four school settings: (1) a Spanish-speaking inner-city school; (2) a black inner-city school; (3) a lower-middle-income white suburban school; and (4) an upper-middle-income white suburban school. An analysis of pre-test and post-test data revealed that these systematically developed and sequential materials effectively promoted beginning printing skills in all four socio-economic-status and cultural settings. The author concludes that printing skills can be developed in kindergarten and that there is no reason to delay printing instruction to grade one.

31. Sallot, Jeff. "Is Good Handwriting the Key to Reading?" *The Globe and Mail*, March 31, 1977.
An interview with Andrew Spowart, teacher in a North York elementary school who claims that skill in handwriting is essential for good spelling and reading on the part of students. Children who show an inability to print and write properly are said to have failed

to internalize individual letters. Successful techniques for teaching handwriting require more than the mere copying of letters and shapes on the page. The child must be able to recreate the image in his mind so that it can be duplicated at any time. When the basic alphabet building blocks are not internalized, reading and writing skills will inevitably suffer. Results from Spowart's methods in remedial classes have shown that students with reading problems do improve when they have internalized alphabetic characters, although no systematic study with control groups has been undertaken to find the actual magnitudes of those improvements.

32. Sorenson, Marilou R. "Write On: Creative Handwriting in the Classroom." *Language Arts*, March 1977: 294-296.
Claims that in order for handwriting instruction to be a successful and enjoyable experience, it must be related to the child's own experiences and interests. The author gives suggestions as to how this can be done through interdisciplinary activities which integrate writing exercises into the total curriculum.

33. Strahan, Mary Anne. "Film Loops to Teach Handwriting." *The Instructor*, May 1971: 70-71.
Describes a project at the Hawaii Curriculum Centre, Honolulu, where continuous film loops are used to teach handwriting to children. Through the use of automatic machinery, the child can get as much drill as he needs without requiring the teacher's constant attention, and while progressing at his own rate of speed.

34. Westbrooks, Linda K. "Prescription for Ailing Penmanship." *Teacher*, September 1976: 100-106.
Describes a program, created by the author, which focuses on 12 common handwriting mistakes, or what she refers to as "handwriting diseases." The approach is based on a medical diagnosis, whereby each student's handwriting is checked for one or more of the 12 specific diseases: giantwritis (writing that is too large); "t"sles (uncrossed t's), sloppox (sloppy writing), or one of the nine other ailments. After one to two weeks of treatment for a selected disease, the handwriting is again analyzed, and if an improvement can be seen, a medical clearance is given. After all diseases improve, a certificate of health is issued. The author claims that this fun approach to teaching handwriting has produced excellent results, both in attitudes and in handwriting.

Currently, most school systems in North America teach manuscript handwriting (with discrete letters) in first and second grade, and then require the student to switch to a cursive writing style (with connected letters) in grade three. Many educators question both the need and the wisdom of having students undergo such a transition, and advocate the exclusive use of either a print or cursive script. Others claim that the dual system should be maintained, arguing that the simplified letter strokes of manuscript (i.e., lines and circles) are more easily mastered by the beginning writer because they are more closely related to his level of psycho-motor development. Because manuscipt is said to lack the speed, rhythm and individuality of cursive script; however, it is argued that a flowing cursive style must also be taught as a suitable adult writing mode. As a compromise, some have suggested that an italic writing style, consisting of connected print-style letters, be adopted; however, the teaching of italic has not gained wide acceptance in North American schools.

The bibliographic entries in this section reflect this ongoing controversy over the relative merits of manuscript, cursive, and italic handwriting. Although the research findings in this area are inconclusive, it appears that 'normal' school children can master both manuscript and cursive forms of writing with relative ease, and can produce comparable writing in terms of speed and legibility. However, the section of this bibliography dealing with learning disabilities suggests that a cursive writing style may be most effective in the case of children with perceptual disorders, while a manuscript style may be more suitable for children with motor disabilities.

35. Bell, Mary. E. "Manuscript Writing After the Primary Grades." *Education*, September/October 1968: 81-83.
Points to the merits of manuscript writing and suggests that children in all grades be given the opportunity to use manuscript instead of, or in conjunction with, cursive script. The author suggests that manuscript writing is: (1) especially good for children with poor coordination because of the discrete letter strokes; (2) advantageous to slow learners who have been shown to develop handwriting skills faster with manuscript; (3) more easily perfected by left-handed children; and (4) more resistant to deterioration in legibility in both children and adults when writing speed is increased.

36. Berry, Winifred. "Italic Writing." *Education Digest*, April 1961: 50-51.
Claims that the quality of handwriting has deteriorated to the point of illegibility in the case of most American adults, and suggests that the use of italic script (rather than cursive) could produce greater legibility, since it is similar to the manuscript style taught in the earlier grades. Instead of switching from manuscript to cursive -- two very different writing styles -- the child can merely modify the manuscript form, through slant and the joining of letters, to arrive at an italic style, that is suitable for adults. This, the author claims, will avoid the confusion that now exists when children are required to change from manuscript to cursive.

37. Byers, Loretta. "The Relationship of Manuscript and Cursive Handwriting to Accuracy in Spelling." *The Journal of Educational Research*, October 1963: 87-89.
This study was designed to test the following hypothesis: 'Cursive writing is more conducive than manuscript writing to accuracy in spelling because a word with connective strokes is sensed as an entity by the speller, whereas in manuscript writing each letter is separate and the writer does not have as much feeling of a word.' Twenty-four grade three classes in the Santa Barbara school system of California were divided into two groups of similar socioeconomic status children. Group A students were required to write a story (as dictated to them by their teacher) in manuscript writing, and then again in cursive script ten days later. Group B children wrote the same dictated story initially in cursive writing and then ten days later in manuscript. Such a reversal of the two

writing sessions (cursive and manuscript) for Groups A and B was included to determine whether the ordering of the writing tasks had any effect on the spelling error rate. Means and standard deviations for spelling errors in both manuscript and cursive writing samples were then calculated and tested statistically (Z-scores) to determine which writing style produced the lowest error rate. It was found that: (1) the ordering of the writing tasks did not affect spelling error rate; (2) the hypothesis was not borne out by the data (although there were somewhat fewer total errors in the manuscript group, the difference was not statistically significant); (3) there were more errors in transposing letters in manuscript than in cursive writing (e.g., chlidren instead of children; (4) more letters were omitted in manuscript than in cursive writing; (5) more substitution of letters occurred in cursive than in manuscript (e.g., thay instead of they); and (6) children were more apt to omit a word entirely in cursive than in manuscript writing. In general, therefore, it was concluded that there are only slight differences favoring manuscript writing with regard to spelling accuracy.

38. Crawford, Patricia and Brenner, Lynne. "The Results of a Preliminary Examination of Manuscript Versus Cursive Writing." Willowdale, Ontario: The North York Board of Education, Educational Research Services, 1972.

The purpose of this study was to compare the effects of manuscript and cursive writing styles in terms of reading and writing speed, detection of spelling errors and reading comprehension. One hundred and twenty-four grade five students in two North York schools were randomly assigned to either manuscript or cursive groups, where exercises in the appropriate handwriting style were given. Analysis of the means and standard deviations of tests measuring spelling errors, reading and writing speed, and level of reading comprehension showed no significant differences between the two groups in any of these areas.

39. Early, George H. "The Case for Cursive Writing." *Academic Therapy*, Fall 1973: 105-108.

Advocates the exclusive use of cursive writing in the early elementary grades, and maintains that a switch from manuscript to cursive may be harmful to children with learning disabilities. The author suggests that with cursive script, 'the child more readily experi-

ences the total form or slope of a given word as he monitors the kinesthetic feedback from his writing movements.' He also suggests that cursive script entails a natural rhythm which promotes an automatic writing response. When the writing act becomes automatic, the child is not burdened with the necessity of attending cognitively to the production of appropriate hand and arm movements. Instead, the cognitive energy can be totally directed to the message that the child wishes to convey. Manuscript writing is not seen to entail such rhythmic movements, and hence does not promote the automatic writing response as easily as does cursive script. It is suggested that beginning writers make six to eight inch letters when embarking on a handwriting program, and then gradually reduce letter size when finer finger movements can be handled. Such a transition is said to be developmentally sound in view of the proximo-distal developmental sequence of the child.

40. Enstrom, E.A. "Myths About Manuscript Writing." *Education*, September/October 1969: 51-55.

An attempt to explode current myths about manuscript writing and its supposed advantages over cursive script. Enstrom claims that manuscript writing is slower than cursive, is more tiring for finger muscles, and causes words to look disjointed to a child, which is not the case with flowing cursive script. Because of this, he concludes that manuscript is an inferior writing mode and that it should be viewed only as a precursor to adult cursive writing. The author criticizes studies which require students to write for two minutes in cursive and two minutes in manuscript, and then compare writing speed. In his own research, he has found that two minutes are inadequate to show the increased muscle tension and reduction in speed that occur in the manuscript mode. Regarding legibility, he suggests that a poor cursive writer will not become a better writer through the use of manuscript. In his experience, good cursive writers are also good manuscript writers, and poor cursive writers are similarly poor manuscript writers. The same holds true for writing speed. It has been suggested that children with learning disabilities can handle manuscript writing easier than cursive. Enstrom questions this claim and proposes that the unity of words associated with cursive writing should promote increased reading competence. More study is obviously

needed before any conclusion can be made here. In general, the author supports a dual system of handwriting, whereby manuscript is taught in the earlier grades and cursive writing at a later point in the child's program of study. He suggests that the transition to cursive could be improved, however, perhaps through a move from vertical print to slant print to slant cursive.

41. Freeman, Frank N. "On Italic Handwriting." *Elementary School Journal*, February 1960: 258-264.
Critique of a book by Reginald Piggott entitled Handwriting, a National Survey. Piggott suggests that italic script be adopted as an alternative to cursive writing because of its higher legibility and a closer resemblance to manuscript writing, which would make the transition to an 'adult' writing style much easier for the child. Freeman takes exception to these notions and warns against comparing good italic script with poor cursive writing, as he suggests italic advocates have done. The author claims to have no objection to the use of italic script, but he warns that more study should be undertaken in comparing cursive with italic script (in terms of speed and legibility), before italic writing is adopted as a cure for illegibility.

42. Groff, Patrick J. "From Manuscript to Cursive - Why?" *Elementary School Journal*, November 1960: 97-101.
This study attempted to determine why school officials in American school boards require children to learn manuscript writing in the early grades and then switch to cursive at a later point in their program of study. For this purpose, questionnaires were sent to 72 directors of education in the central cities of 72 of the most populous metropolitan areas of the United States, asking them to complete the following statement: 'Our school system changes from manuscript to cursive handwriting because in the grades in which cursive is taught...' It was found that decisions to change from manuscript to cursive are based mainly on tradition and wide usage, not on the basis of any empirical research findings.

43. Hildreth, Gertrude. "Simplified Handwriting for Today." *Journal of Educational Research*, February 1963: 330-333.
Objects to the changeover from manuscript to cursive writing in the elementary grades and refers to it as a wasteful and unnecessary use of the child's and teacher's time. The author points to studies in the psychology of learning which show that first-learned skills tend

to persist and interfere with later-learned related skills, and claims that children must be thoroughly retrained and drilled in the new forms to prevent reversion to earlier forms and to offset interference of the earlier manuscript writing practices. She further claims that there is no natural transition from manuscript to cursive script because the letter strokes are distinctly different in each case. However, by modifying the manuscript style through slant and the joining of letters, it is possible to create a closely related italic script that builds on the basic manuscript form and leads to a legible flowing adult handwriting style.

44. Horton, Lowell. "Print Script Handwriting: The Innovation That Endured." *Contemporary Education*, April 1972: 287-288.
Questions why manuscript writing (as a twentieth-century innovation in elementary education) has endured to the present day. The author suggests the following reasons: (1) the manuscript innovation took into account the physical characteristics and developmental needs of young children; (2) it was easier to teach than cursive; (3) it was inexpensive to implement with no new equipment or materials required; (4) it replaced an element already in the curriculum so that time constraints were not imposed; (5) it supposedly enhanced reading skills due to its resemblance to printed texts; (6) it did not alter existing educational objectives or school goals; and (7) it was made attractive through excellent commercial teaching materials.

45. Jackson, Arthur Dale. "A Comparison of Speed and Legibility of Manuscript and Cursive Handwriting of Intermediate Grade Pupils." Ed.D. Dissertation, University of Arizona, 1970.
The study compares the speed and legibility of 108 intermediate grade students who had been taught either exclusively manuscript or manuscript and cursive handwriting. Analysis of Otis Quick-Scoring Mental Ability Test scores and samples of each student's handwriting showed that: (1) pupils taught manuscript exclusively wrote as fast or faster than those who had switched from manuscript to cursive; (2) manuscript writing was more legible; (3) sex was not a significant factor in writing speed, but was significant in terms of legibility, with girls having a higher writing quality; (4) handwriting speed increased with grade level attained; and (5) intelligence level did not have any effect on legibility.

46. Minkoff, Harvey. "Teaching the Transition from Print to Script Analytically." *Elementary English*, February 1975: 203-204.
Suggests that it is important for students to understand rather

than to memorize curricular materials, and for them to be taught to reason logically rather than to accept facts blindly. With regard to the teaching of cursive handwriting, the author insists that it should not be taught in the same rote fashion in which manuscript was initially taught, since the student will be able to build on the previously mastered letter concepts of the print-script. Thus, rather than being presented as a completely new skill that must be memorized, cursive should be taught as a modified form of print, with joined and slightly altered letters for speed and flowing movement.

47. Niemann, Ann Smith. "Handwriting, Spelling & Creative Writing in the Primary Grades." *Elementary English*, December 1971: 963-969.
A review of the manuscript - cursive issue as of 1971, pointing to both the advantages and disadvantages of manuscript writing as a lifelong handwriting style. It is suggested that (1) manuscript writing is easiest to read; (2) it promotes letter recognition on the printed page and thereby enhances reading skills; (3) it aids spelling; and (4) it generally leads to greater fluency on the part of the child. Younger children are said to learn manuscript forms (i.e., the line and circle) more readily than the complex forms of cursive writing because they are more in line with their motor and eye-arm-hand coordination.

48. Plattor, Emma E., and Woestehoff, Ellsworth S. "Toward a Singular Style of Instruction in Handwriting." *Elementary English*, December 1971: 1009-1011.
The authors question the need to change from manuscript to cursive handwriting in elementary school, and advocate that manuscript be maintained as the sole writing style throughout the child's educational career. They suggest that if the goal of handwriting is speed and legibility, then both of these goals can be achieved as easily with manuscript as with cursive, while not requiring the child to learn two different methods of handwriting.

49. Renaud, Albert Jr., and Groff, Patrick J. "Parents' Opinions About Handwriting Styles." *Elementary English*, December 1966: 873-876.
This study was designed to determine parents' opinions about the relative merits of manuscript and cursive handwriting. Questionnaires with ten yes/no answers were distributed to 328 parents of primary and intermediate students in a suburban community of Southern California. The percentages of yes and no responses were then calculated for each question and reported in tabular form.

The most significant findings were as follows: (1) 89.0 per cent of parents approve of manuscript writing in grades one and two; (2) 81.1 per cent object to the use of manuscript through grade six; (3) 85.7 per cent believe that more attention should be given to handwriting skills. It was concluded that most parents object to the exclusive use of manuscript writing in intermediate and higher school grades, and therefore wish to maintain a dual handwriting program.

50. Templin, Elaine, and King, Fred M. "Manuscript and Cursive Writing." *NEA Journal*, November 1964: 26-28.

The two authors take different positions on the manuscript-cursive debate, with Templin insisting that either one or the other be used exclusively throughout the school program, and King maintaining that the dual system must be retained. Templin claims that there is no evidence to suggest that the changeover program is superior to an all-cursive or all-manuscript program, but there is some scientific evidence which supports the premise that it is more difficult for an individual to master two sets of handwriting symbols than to perfect one set, be it manuscript or cursive. She believes that the need to switch writing styles cripples most young writers and causes a high rate of illegibility. King, on the other hand, claims that we must teach both writing styles to serve different purposes at different times in the individual's life. Manuscript is claimed to (1) facilitate reading because of its similarity to printed script; (2) aid in spelling; and (3) be better adapted to the motor skill development of young children. However, it is said that cursive writing must also be taught so that: (1) students can engage in cursive reading; (2) because cursive is preferred by children; (3) because it is easier to write; (4) because it is required as a legal signature; and (5) because it promotes individuality. The author suggests that the changeover from manuscript to cursive causes problems for the child only when it is introduced too early.

51. Voorhis, Thelma G. *The Relative Merits of Cursive and Manuscript Writing*. New York City: Teachers College, Columbia University, 1931.

Summarizes the published claims and experimental results of manuscript and cursive handwriting techniques and makes comparisons on the basis of speed, legibility and their effect on learning to

read. A study conducted by the author divided grade one students into two groups with equal I.Q. scores, socioeconomic status and kindergarten background, and gave one group instruction in cursive writing, and the other instruction in manuscript. In both cases, the method of instruction was the same, and teachers of both groups were rotated so that the effects of the teacher on mode of instruction could be controlled. Analysis of the data revealed the following results: (1) the manuscript group wrote faster than the cursive group, but the quality of the writing in the cursive group was superior; (2) the manuscript group learned to read faster than the cursive group; (3) manuscript writing had a greater impact on learning to read than did attendance in a pre-school or kindergarten program; and (4) manuscript writing was as much of an asset to highly intelligent students in learning to read as it was to students with lower I.Q. scores.

52. Wilson, Louis Ada. "Helping Children with Manuscript Writing." *Peabody Journal of Education*, September 1969: 72-76.
It is claimed that the manuscript handwriting of children should have a comparable kinesthetic movement to that of cursive handwriting for lower case letters and similarly-formed upper case letters. When techniques are used which utilize this movement, children face fewer problems when transferring from manuscript to cursive. (Kinesthetic movement here refers to the sensing of movement by the muscles). The author suggests that hand and arm movements for the formation of both manuscript and cursive letters be essentially the same, with the only major difference being that in manuscript, part of the movement takes place above the paper, while in cursive, the movement from one part of the letter to the next, and from letter to letter, is made on the paper. (Examples of appropriate manuscript letter forms are given in the text.) It is also suggested that, because of recent research findings, the transition to cursive be delayed until fourth grade, since children are too immature physically to perform cursive writing successfully prior to this time.

Our ability to communicate through handwriting is determined directly by the ability of others to comprehend what we have written. If one's handwriting style proves to be illegible, then his/her communication skill in this medium is severely limited. This section of the bibliography deals with the evaluation of handwriting quality by students and teachers. Although formal rating scales have been abandoned in most schools, self evaluation summary sheets are frequently used in order to have students critically evaluate their letter forms for uniformity of slant, spacing, proportion, alignment, and so forth. Results from several studies are also included, whereby handwriting quality is related to essay marks, handedness and sex differences.

53. Allen, Elizabeth G., and Wright, Jane P. "Personalized Handwriting Instruction." *The Elementary School Journal*, April 1974: 424-429.
Emphasizes the importance of gearing handwriting instruction to the unique abilities of each individual student. The authors describe an 'Individual Summary Sheet' developed at Auburn University to help the student and teacher analyze the quality of manuscript and cursive script. Requiring the student to examine samples of his own handwriting, while paying particular attention to letter formation, proportion, size, slant, spacing, stroke, and alignment, gives him a clear perception of his own writing, with an awareness of specific areas requiring improvement and those in which he currently excels. The objective behind the summary sheet is to have the student become critically aware of his own writing style and to suggest to the teacher how he can help the student improve his own work.

54. Anderson, Dan W. "What Makes Writing Legible?" *Elementary School Journal*, April 1969: 364-369.
Describes a study conducted in the state of Wisconsin, wherein 588 handwriting samples were randomly selected from a total of 5286 grade four, five and six students, and rated by 74 judges on the basis of legibility. Using a correlation analysis, the researcher attempted to rate the general (and subjective) rating of 'legibility' to such factors as size, slant, and uniformity. It was found that: (1) girls were generally better writers than boys; (2) girls had a less slanted style than boys; (3) more legible writing was correlated with larger letter size, and with a more uniform slant; (4) larger writing styles tended to be less uniform in letter size formation; and (5) pronounced slanted styles had a more uniform slant.

55. Briggs, Dennis. "The Influence of Handwriting on Assessment." *Educational Research*, November 1970: 50-55.
The purpose of the experiment described in this paper was to see if teachers, in their assessment of children's essays, were influenced by the quality of the handwriting style. Ten essays were chosen from a large number written by eleven-year-old children on the theme 'The Day of the Big Fog.' A range of ten contrasting handwriting styles was chosen from those of other children, and the ten handwriters reproduced each of the ten essays, thus giving 100

combinations of content and handwriting styles. Ten groups, consisting of five teachers each, were asked to assess the students' essays. Five of the groups consisted of primary teachers only with the remaining groups consisting of secondary teachers only. All teachers were instructed to 'impression mark' and to rank the essays. There was no indication of the fundamental purpose of the experiment. Analysis of variance indicated (1) that good handwriting quality did have a significant positive influence on the teachers' marking ($p = 0.001$); and (2) that there may be a small difference in attitude towards handwriting on the part of elementary and secondary teachers, although the difference was not statistically significant.

56. Enstrom, E.A. "The Decline of Handwriting." *The Elementary School Journal*, October 1965: 22-27.
The author claims that in the larger schools in the United States, handwriting was taught more skilfully between 1900 and 1930 than at any other period before or after, and attempts to account for this decline since the early decades of the century. In the 20's and 30's educators rebelled against the narrowness of the teaching of handwriting in schools and insisted that an integrated approach (i.e., with reading and spelling) be adopted in order to make the task more meaningful. This new philosophy, in conjunction with the need to drop 'fads and frills' during the 1930's depression, caused the elimination of teachers who specialized in handwriting instruction. By the early 40's, few colleges were preparing teachers for instruction in handwriting in the elementary grades. By mid-century new innovations received the major attention in educational circles, while the "basics" seemed to be crowded into the background. Today, the authors suggests, skill in teaching handwriting has been lost for the most part, resulting in an illegible hand for many students leaving school.

57. Groff, Patrick. "The Future of Legibility." *Elementary English*, February 1975: 205-212.
Reviews recent American handwriting studies and suggests that a decrease in the legibility of students' handwriting has been caused by a decreased emphasis on this skill, both by faculties of education and individual school boards. In 1961, for example, it was found that only 50 per cent of U.S. elementary schools had a

separate period of handwriting instruction. The author believes that this state of affairs is undesirable, and suggests that learning to write fluently and legibly is like learning to play a musical instrument: drill and repeated practice are essential. Although rating scales have been more or less abandoned in recent years, it is felt that students require some model with which to judge the quality of their work. They simply cannot be expected to supply their own standards, when they do not understand what a proper handwriting style looks like.

58. Horton, Lowell Wayne. "An Analysis of Illegibilities in the Cursive Handwriting of 1000 Selected Sixth-Grade Students." Ph.D. dissertation, Ohio State University, 1969.
Handwriting samples from 1000 sixth-grade students were analyzed in order to determine how sex and handedness might affect handwriting quality. The evaluation of the handwriting specimens by three judges indicated that right-handed girls had the most legible cursive writing style, and left-handed boys the most illegible. However, the quality of all students' handwriting was judged to be sub-standard insofar as the right-handed girls (the highest quality group) produced 25 per cent of their letters illegibly while the left-handed boys produced almost 50 per cent of their letters in an illegible manner.

59. Markham, Lynda R. "Influences of Handwriting Quality on Teacher Evaluation of Written Work." *American Educational Research Journal*. Fall 1976: 277-283.
In this study the author attempted to determine what effect the quality of a student's handwriting had on an elementary school teacher's evaluation of his/her written work. Compositions created by grade five students in a medium-sized southwest American city were ranked according to content as being either good, medium or poor. Each paper was then reproduced in various writing styles that were also ranked good, medium and poor. Teachers were asked to grade papers randomly assigned to them. Multiple classification analysis was used to assess the relationship between the resulting evaluation and handwriting style, and to determine what effect various teacher characteristics had on the student rating. It was found that: (1) none of the measured teacher characteristics explained a significant portion of the variance of marks given on the papers; (2) the amount of

variation in marks that was explained by handwriting quality was statistically significant at the 0.01 level; (3) the amount of variation in marks that was explained by the content of the papers was statistically significant at the 0.01 level; and (4) the interaction of handwriting quality and content was not statistically significant. From this sample of teachers, therefore, it was concluded that papers with better handwriting consistently received higher scores than did those with poor handwriting, regardless of the quality of the content.

60. Marshall, Jon C. "Writing Neatness, Composition Errors, and Essay Grades Re-examined." *Journal of Educational Research*, January 1972: 213-215.

"Sixteen forms of an essay exam, identical in content but differing in writing neatness and number of composition errors, were graded by 480 classroom teachers. The two factors consisted of four writing treatments (typed, 'neat' handwritten, 'fair' handwritten, and 'poor' handwritten) and four levels of composition errors (0, 6, 12, and 18 spelling errors). The data were analyzed using a 4 x 4 factorial design. No significant differences were found."

LATERALIZATION OF THE BRAIN

Recent research in brain organization and lateral specialization has shown some remarkable differences between right- and left-handed individuals. Historically, handedness has been thought to result from environmental influences, rather than from some inherent characteristic of the individual; but current research investigations have shown that hand preference may be determined exclusively by the left-right lateralization of the brain. Whereas right-handed individuals typically have verbal ability localized in the left hemisphere and visuo-spatial ability localized in the right hemisphere of the brain, the contrary is true for many left-handed subjects, although the extent of laterality is much less striking. This suggests that brain lateralization may have some impact on hand preference. Furthermore, because of greater degrees of specialization in the left hemispheres of most females, and in right hemispheres of most males, visuo-spatial abilities appear to be more developed in right-handed boys and left-handed girls, and verbal ability more developed in right-handed girls and left-handed boys. Such inherent sexual differences suggest that somewhat different instructional techniques for left- and right-handed boys and girls may be necessary to enhance existing learning potentials in verbal and spatial tasks, although much more research in this area is required before conclusive results are reached. The following bibliographic entries examine existing research findings in this area and discuss the implications for future inquiry.

61. Deutsch, Diana. "Pitch Memory: An Advantage for the Left-Handed." *Science*, February 3, 1978: 599-560.
"In an auditory or musical memory task, subjects made pitch recognition judgements when the tones to be compared were separated by a sequence of interpolated tones. The left-handed subjects performed significantly better than the right-handed and also had a significantly higher variance. Further analysis showed that the superior performance was attributable largely to the left-handed subjects with mixed hand preference."

62. Galabura, Albert M.; LeMay, Marjorie; Kemper, Thomas L. and Geschuund, Norman. "Right-Left Asymmetries in the Brain." *Science*, February 24, 1978: 852-856.
This article reviews several recent research studies concerned with hemispheric specialization in the human brain, and suggests that lateral dominance exists for such functions as language ability, handedness, musical talents, neurospatial ability, attention span, and emotional outlook. A summary of research findings on asymmetries in the size of the hemispheres of the brain indicates that: (1) brains without a particular asymmetry are more common in left-handed individuals; (2) left-handed persons are more likely than right-handed persons to show reverse asymmetry, although the extent of the asymmetry is less marked; (3) asymmetry in some left-handed individuals is in the same direction as that of right-handed individuals, but it is also less striking; (4) the region which is larger on one side of the brain varies from being only slightly larger to many times larger; (5) asymmetries appear to be inborn, since they are present in the foetus; and (6) there appears to be sex differences in the distribution and extent of the asymmetries. Such asymmetries are said to determine lateral dominance, with the larger hemisphere associated with greater specialization of all functions controlled by that hemisphere.

63. Goleman, Daniel. "Special Abilities of the Sexes: Do They Begin in the Brain?" *Psychology Today*, November 1978: 48-59; 120.
This article provides a review of current research in brain lateralization and its relation to sex differences. It has been found, for example, that girls have greater verbal ability than boys, while boys are more proficient in visuo-spatial and mathematical skills. Through study of brain disfunctions in brain-danaged subjects

it has been discovered that a woman's verbal and spatial abilities are likely to be duplicated on both sides of the brain while in a right-handed man the speech centre is more likely to be located on the left hemisphere, with spatial skills on the right. The author suggests that 'because women's hemispheres may be less specialized for spatial and linguistic functions, it may be easier for them to perform tasks which combine the two in a single activity, such as reading...' while men's brains 'may make it easier for them to keep separate cognitively different activities done simultaneously, such as running a drill press while talking.' Further research has shown that such differences arise early in the individual's life, with the right hemisphere of boys developing prior to the left, and and left hemisphere of girls developing prior to the right. This suggests that boys have a head start in developing visuo-spatial skills, while girls have an edge in the area of verbal skills. Other research has found that left-handed children who write with their hands below the line (as opposed to a 'hooked' position), have brains whose organization is a mirror image of that of the average right-handed person. Whereas right-handed individuals have their verbal centre located in the left hemisphere and their spatial centre in the right, these left-handed subjects had the location of each centre reversed. It was again found that the right hemisphere of male subjects and the left hemisphere of female subjects had the highest level of development, but because of the reversal in brain specialization in these left-handed subjects, greater verbal proficiency in males and greater visuo-spatial proficiency in females was evidenced. Such findings indicated to the author that sex differences in verbal and spatial abilities are biologically determined.

64. Levy, Jerre, and Levy, Jerome M. "Human Lateralization From Head to Foot: Sex-Related Factors." *Science*, June 16, 1978: 1291-1292. Considers several recent studies which show that right-hemisphere functions of the brain develop earlier in boys, while left-hemisphere functions develop earlier in girls. Such sex differences were found not only in right-handed children with language functions specialized to the left hemisphere and visuo-spatial functions to the right, but also in a group of left-handed children where the pattern of lateralization is reversed. Hence, it was concluded that hemispheric development as a function of sex is independent

of the specialization of the two hemispheres, and that male and female differences could not be attributed to sociocultural factors encouraging different abilities in boys and girls. A study conducted by the authors shows that asymmetries in the size of the feet are strongly related to sex and handedness, with right-handed males having larger right feet and right-handed females having larger left feet. The reverse was true for left-handed males and females, although the relationship was not as strong. It was concluded that sex has a strong effect on the asymmetric development of the feet, with the direction of asymmetry within the sexes being governed by the same factors that determine handedness.

65. Levy, Jerre and Reid, Marylou. "Variations in Writing Posture and Cerebral Organization." *Science*, October 1976: 337-339.
"Two tachistascopic tests of cerebral lateralization were administered to 73 subjects classified by handedness, sex, and hand orientation in writing. The results indicated that the direction of cerebral lateralization could be indexed from a subject's handedness and hand posture during writing. In subjects with a normal writing posture, the linguistically specialized hemisphere was contralateral to the dominant hand, and the visuospatially specialized hemisphere was ipsilateral; the reverse was true in subjects with an 'inverted' (i.e., hooked) hand position during writing. Females and subjects having an inverted hand posture manifested smaller degrees of lateral differentiation than males and subjects with a typical hand posture."

66. Sackheim, Harold A.; Gur, Ruben C.; and Saucy, Marcel C. "Emotions are Expressed More Intensely on the Left Side of the Face." *Science*, October 27, 1978: 434-435.
"Pictures of human faces posing six distinct emotions (plus a neutral expression) and their mirror reversals were split down the midlines, and left-side and right-side composites were constructed. Subjects judged left-side composites as expressing emotions more intensely than right-side composites. The finding indicates the hemispheric asymmetry in the control over emotional expression in the face."

67. Witelson, Sandra F. "Developmental Dyslexia: Two Right Hemispheres and None Left." *Science*, January 21, 1977: 309-311
"Developmental Dyslexia may be associated with (i) bi-hemispheric representation of spatial functions, in contrast to the right hemisphere specialization observed in normal children, and (ii) typical left-hemispheric representation of linguistic functions, as is observed in normal children. The bilateral neural involvement in spatial processing may interfere with the left hemisphere's processing of its own specialized functions and result in deficient linguistic, sequential, cognitive processing and in overuse of the spatial, holistic cognitive mode. This pattern of cognitive deficits and biases may lead dyslexics to read predominantly with a spatial-holistic cognitive strategy and neglect the phonetic-sequential strategy. Such an approach in learning to read phonetically coded languages, such as English, may be inefficient and limited."

68. Witelson, Sandra F. "Sex and the Single Hemisphere: Specialization of the Right Hemisphere for Spatial Processing." *Science*, July 30, 1976: 425-427.
"Specialization of the right hemisphere for spatial processing was studied in 200 normal boys and girls between 6 and 13 years of age. Boys performed in a manner consistent with right hemisphere specialization as early as the age of 16. Girls showed evidence of bilateral representation until the age of 13. The results suggest a sexual dimorphism in the neural organization underlying cognition during a major period of childhood. The results, which have implications for reading instruction, are discussed in terms of a possible sex difference in neural plasticity during development and the clinical consequences of such a difference."

Because approximately 10 per cent of the school population is sinistral or left-handed, and because the mechanics of handwriting are somewhat different for sinistral than for dextral writers, it seems reasonable to expect that appropriate handwriting instruction for such individuals be included in the school program. The following entries examine some of the implications of left-handedness for handwriting style and technique, and suggest ways in which sinistrals can write both comfortably and legibly.

Although several authors suggest that sinistral writers be required to make letter forms similar to those of the dextral writer, it is becoming increasingly clear that this is really not sound advice. Having a left-handed child write with an unnatural forward slant, for example, may cause unnecessary frustration, when a backward slant can, in most cases, be read as easily as a forward slant. In addition, many educators in the past have urged that the hooked writing position be discouraged in sinistral children, because of ink smearing, obstructed vision for proper letter formation, and postural considerations. However, a study by Levy and Reid, in a previous section of this bibliography dealing with brain lateralization, suggests that 'hooked' or 'below the line' writing in left-handed subjects is somehow related to hemispheric specialization in the brain. Such a finding suggests that any dogmatic position on handwriting instruction for sinistral students is unjustified.

69. Cole, Luella. "Instruction in Penmanship for the Left-Handed Child." *Elementary School Journal*, February 1939: 436-448.
Stresses the importance of treating left-handedness as a normal condition among school children. The major reason why difficulties arise in sinistral handwriting is that the direction of the script across the page (i.e., left to right) is the natural outward direction for the dextral writer, but contrary to that of the sinistral writer. In order for the sinistral writer to enjoy the advantages of the dextral writer, the position of the paper, the slant of the writing, and its direction should all be reversed. Problems for the left-handed writer arise primarily because he cannot write as comfortably from left to right as he could from right to left. This requires him to adopt an awkward hand posture in order to see what he is writing and to prevent the smearing of the ink. The author suggests a suitable hand position for the sinistral writer, keeping the hand below the writing line.

70. Coren, Stanley, and Porac, Claire. "Fifty Centuries of Right-Handedness: The Historical Record." *Science*, November 1977: 631-632.
"A survey of more than 5000 years of art work, encompassing 1180 scorable instances of unimanual tool or weapon usage, revealed no systematic trends in hand usage. The right hand was used in an average of 93 per cent of the cases, regardless of which historical era or geographic region was assessed."

71. Enstrom, E.A. "The Extent of the Use of the Left Hand in Handwriting." *Journal of Educational Research*, February 1962: 234-235.
Describes a survey conducted in the school systems of Pennsylvania, Ohio, New Jersey and New York, in which questionnaires were sent to 10,000 elementary school teachers asking what proportion of their students were sinistral. Analysis of about 900 returns from the survey showed that 11.1 per cent of all students in the sample wrote with their left hands, with an average rate of 12.5 per cent for boys and 9.7 per cent for girls. These findings, with but slight fractional variations, also held for each grade (i.e., one through six), and across state boundaries.

72. Enstrom, E.A. "The Relative Efficiency of the Various Approaches to Writing with the Left Hand." *Journal of Educational Research*, August 1962: 573-577.

The author attempts to determine the efficiency of various handwriting approaches employed by left-handed children. Through the use of cameras and sketch pads, he examined the writing style of 1103 left-handed students in grades five through eight, and uncovered fifteen different techniques that could be classified, and that were used frequently enough to be tested for relative efficiency. In addition, he found that two major groups of left-handed writers exist: (Group 1) those who keep the writing hand below the line; and (Group 2) those who approach from the left side of the paper and more or less 'hook' the wrist while writing. Techniques were tested according to (1) quality of writing; (2) speed; (3) ability to produce neat smear-free papers, and (4) healthful body posture considerations. Enstrom concluded that the six techniques classified under group one (i.e., hand below the line) were superior to the nine techniques classified under group two (i.e., hand hooked), all things being considered, and that they should be taught to left-handed children at the beginning stages of writing.

73. Foerster, Leona M. "Sinistral Power! Help for Left-Handed Children." *Elementary English*, February 1975: 213-215.
Approximately 10 per cent of the American population are left-handed. This suggests that the teaching of special handwriting techniques to sinistral children should be an important part of the elementary school curriculum; yet for the most part, very little special attention is given to the left-handed child. The author suggests that no handwriting instruction should be given until a child shows a definite hand preference. Once handedness has been established, handwriting techniques different from those used with dextral children can be employed. It is suggested that left-handed writing instructors work with sinistral children. If the classroom teacher is dextral than she/he may wish to team-teach with another sinistral teacher or a sinistral aide. Basic postural, arm and hand movement and paper positioning techniques for left-handed writers are also explored.

74. Freeman, Frank N. "How to Deal with Left-Handedness." *NEA Journal*, January 1960: 12-13.
Discusses the origins of handedness in human children and suggests that hand preference is closely related to the bilateral arrange-

ment of the brain. In the right-handed person, the centre of speech is situated in the left hemisphere, near the centre that controls the movement of the right hand. In the left-handed individual, the speech control centre is in the right hemisphere. This suggests that hand preference is based on the physiological constitution of the organism and not on personal whim or habit. Several researchers have suggested that the speech centre is so closely connected with the centre of control for the dominant hand that any changeover attempt could confuse control over speech activities and cause stuttering and stammering. Others believe that such speech problems arise because of the general emotional reaction caused by having to act in a way contrary to one's natural preference.

75. Neufeld, Karen. "Open Letter to a Right-Handed Teacher." *Language Arts*, September 1976: 668-669.
Argues that left-handed children should not be required to follow the same writing techniques as right-handed children. She comments on three areas where different techniques should be allowed: (1) the direction of circle formation (clockwise); (2) the slant of cursive script (to the left); and (3) paper position (opposite to that of the right-handed child).

76. Ramos, Randy. "Left-Handed Handwriting." *Academic Therapy Quarterly*, Fall 1968: 47-48.
Gives some very general advice for the teaching of handwriting to left-handed children, in the areas of paper and hand positioning, pencil pressure, slant, and letter spacing. The author disagrees with the notion that left-handed children should be required to write in a style similar to that of the right-handed individual.

TEACHING HANDWRITING TO CHILDREN WITH LEARNING DISABILITIES

Children with learning disabilities, especially those with neurological impairments related to visual and tactile functioning, typically experience problems in letter-form discrimination, and consequently in writing in a legible and fluent manner. The following references are concerned with brain-damaged, retarded, dyslexic, aphasic, and other neurologically and emotionally impaired children, and suggest possible approaches for teaching handwriting and other communication skills to them.

77. Arena, John I. "Building Handwriting Skills in Dyslexic Children." U.S.A.: *Academic Therapy Publications*, San Rafael, California, 1970.

Presents several articles dealing with the problems and processes associated with the teaching of handwriting to dyslexic children. Most of these articles had been published previously in the Fall 1968 issue of Academic Therapy Quarterly and constitute separate entities in this bibliography.

78. Campbell, Dorothy Drysdale. "Typewriting Contrasted with Handwriting: A Circumvention Study of Learning-Disabled Children." *Journal of Special Education*, Summer, 1973: 155-168.

The purpose of this study is to determine whether typewriting, a relatively simple motor task, requiring little eye-hand coordination, facilitates early reading instruction in learning-disabled children more than does handwriting, a complex motor task requiring a great deal of eye-hand coordination. Fifty seven-to-ten-year-old students with a developmental lag in psycho-motor functions were divided into two groups of 25 students each, so that each group had a comparable mean IQ score, chronological age, and so forth. Group T was required to complete all written work with a typewriter (using a trial and error or 'hunt and peck' method), while Group H completed the same assignments in their own handwriting. Improvements in reading vocabulary and reading comprehension before and after the experiment were measured through the use of the Gates-MacGintie instrument, with the gains in raw scores analyzed by t-tests. It was found that the T Group obtained a mean gain in reading vocabulary of 8.36 raw score points and the H Group a gain of 4.06 points (statistically significant). It was concluded, therefore, that the use of typewriters facilitated the acquisition of reading vocabulary skills more than did handwriting. The T Group also made greater gains in reading comprehension, although the difference was not as marked.

79. Carter, John L., and Synolds, Donald. "Effects of Relaxation Training upon Handwriting Quality." *Journal of Learning Disabilities*, April 1974: 236-238.

"It was theorized that brain-injured children who have poor handwriting are in fact trying too hard to write and using too much energy in the process. An audio-taped relaxation program was

devised and presented to 32 boys who were in special classes for minimally brain-injured children. An equal number of randomly selected age mates were chosen as controls. Relaxation training was administered to the experimental group three days a week for four weeks. Results indicated that: (1) the program was effective in enhancing the quality of handwriting; (2) there was transfer effect to non-experimental situations; (3) the changes were stable over time; and (4) there was very high interjudge reliability in the assessment of handwriting quality.

80. Enstrom, Erick A. "Out of the Classroom: Handwriting for the Retarded." *Exceptional Children*, February 1966: 385-388.
The author claims that retarded children need to learn handwriting as a communication skill, and that for the most part, they can be taught this skill with a high degree of success. The paper gives some general advice for the teaching of handwriting to retarded children. For example, the instructional pace must be slower than with normal students, and the teaching style more detailed and exacting. In addition, a simplified alphabet should be introduced, and preceded by an extensive readiness program entailing progression from hand and arm exercises to simple hand strokes to the simplest letter forms. The author suggests that in many cases adult cursive script can also be mastered at a later point in the instructional program, and should be introduced for the sake of the individual's morale.

81. Fauke, Joyce; Burnett, Joseph; Powers, Mary Ann; Sulzer-Azaroff, Beth. "Improvement of Handwriting and Letter Recognition Skills: A Behavior Modification Procedure." *Journal of Learning Disabilities*, May 1973: 296-300.
Discusses a behavior modification procedure used with a six-year-old boy having behavioral problems in the classroom, and difficulty in mastering handwriting tasks. In the experiment the boy was presented with several handwriting instructional procedures which were associated with positive reinforcement, contingent upon successful completion of the task. Initially candy was paired with praise and approval for each correct verbal and written response, but as the experiment progressed and the percentage of correct responses increased the reinforcement was made contingent

on an increased number of correct answers. Results showed that 'the subjects achieved 100 per cent proficiency in oral identification, writing letters with a model, and writing letters without a model over the experimental period from their baseline lows of 43 per cent, 25 per cent, and five per cent respectively.' Follow-up testing two weeks and one month later showed that the child's level of performance continued to be maintained in the regular classroom situation.

82. Freischlag, Jerry. "Motor Activities to Teach Handwriting to the Poorly Coordinated." *School and Community*, May, 1973: 28-29; 25.
This article deals with neurologically impaired children who have been shown to lack an extensive development and integration of visual, tactile and proprioceptive skills necessary for skillful handwriting. Hence, extensive exercise in each of these three modalities is suggested as a part of the readiness program for such neurologically impaired children. Examples of suitable motor activities are presented.

83. Glynn, E.L., Wotherspoon, A.T., and Harbridge, R. "Towards Self-Management of Generative Writing in the Special Class." *The Exceptional Child*, March 1976: 31-45.
This study attempted to demonstrate the long-term effects of behavior modification procedures in altering the writing behavior of children with learning disabilities. Nine children with two to four years of reading failure, an intelligent quotient ranging from 66 to 74, and a mean chronological age of eight years, four months were selected for the study. Baseline tests were given to the nine children to determine their proficiency in: (1) copying words; (2) transcribing words; (3) generating their own words; and (4) generating complete sentences. Following the baseline testing, the classroom teacher began to issue token points and social reinforcement for improvements in any of the four writing tasks. The token points could be exchanged for play time in a toy-field area, the amount of time allocated being proportional to the number of token points earned. The token points were contingent on specific writing behavior so that more points were given for more complex tasks. At the end of the 120-day program, students were again tested for proficiency in the four writing areas. All nine children, who at the beginning of the study were

performing only copying and transcribing tasks, were producing complex sentences by the end of treatment. Samples of the students' work further showed that written sentences had progressed from simple repetitive statements to more complex statements elaborating on one theme.

84. Hanson, Irene W. "Teaching Remedial Handwriting." *Language Arts*, April 1976: 428-431.
Certain learning disabilities occur only in connection with children's handwriting tasks. This paper focuses on two of these disabilities: (1) a disorder of visual-motor integration known as dysgraphia (the person can speak and read but cannot copy or write letters, words or numbers); and (2) a deficit in revisualization (the person can read but he cannot revisualize letters or words and cannot write spontaneously). Such disorders can occur at all levels of intellectual ability, but the most successful approaches in dealing with these dysfunctions are ones originally created for use with brain-damaged children. The author examines the merits of cursive, manuscript, and italic script and makes twenty-two recommendations for teaching handwriting to these learning-disabled students.

85. Harrison, Enid M. "The Brain-Damaged Child and Writing Problems." *Academic Therapy Quarterly*, Fall 1968: 13-21.
Brain-damaged children may have problems with handwriting because of physical disability, defective eyesight, failure to establish hand dominance, emotional problems, lags in the stages of perceptual development, or mental retardation. In this article, the author concentrates on problems caused by disabilities in specific areas of perceptual development. She suggests that in order to write, a child must have five interrelated perceptual abilities: (1) visual perception, or the capacity to perceive objects, pictures, parts of a whole, and to discriminate; (2) visuo-spatial relationships, or the ability to perceive positions in space; (3) visuo-motor ability, or the capacity to manipulate spatial relationships in order to construct what has been perceived; (4) eye-hand coordination, or the ability to mechanically reproduce what has been perceived; and (5) recall, or the ability to remember complex details necessary for the production of what has been perceived. The author describes a test for children which attempts

to measure disorders in any one of these five perceptual areas. In this way potential writing problems can be spotted early in the instructional program.

86. Iogha, Ruth, and Kaliski, Lotte. "A Musical Approach to Handwriting." *Academic Therapy Quarterly*, Fall 1968: 23-30.
The authors describe a musical approach to the teaching of handwriting to one particular brain-damaged child who showed a great deal of musical ability in spite of her other perceptual handicaps. The creation of songs that the young girl might learn in conjunction with the musical notation enabled her to master the letter shapes of words, while the musical aspect of the exercise gave her strong motivation to learn to print and read.

87. Joseph, Florence, and Mullins, June. "A Script to Supplant Cursive Writing or Printing." *Teaching Exceptional Children*, Fall 1970: 23-24; 29-32.
It is suggested that printing, which is made up of discrete letters, causes problems for children who transpose letters vertically and horizontally, or have other reading disabilities. Printed letters are not connected to show their spatial relationships or proper sequence, and are not slanted, so that they fail to indicate the direction of writing. The authors suggest that cursive script may be easier for perceptually disabled children because of its connective lines which clearly indicate the order, position, and grouping of letters, and because of the slant which indicates the left-right direction of words. However, cursive's dissimilarity to printed text can cause confusion in the reading of print, and therefore a modified writing style, have the flowing and directional advantages of cursive while retaining the basic letter shapes of manuscript, has been created. The connected slanting letters of the print form employed in this writing style resemble 'italic' script somewhat. Field testing of its use conducted in Denmark has shown positive results for many perceptually disabled children.

88. King, Diana H. "Some Practical Considerations in the Teaching of Handwriting." *Academic Therapy Quarterly*, Fall 1968: 7-12.
Suggests that kinesthetic reinforcement is an important aspect of handwriting instruction for dyslexic children. As a kinesthetic pro[illegible] the author suggests that in the initial stages of hand-

writing, the student should be instructed to shut his eyes, while the teacher moves his hand in the desired pattern. Repeated exercises should be undertaken in this fashion until the student can create the letter form himself with his eyes closed and without the teacher's aid. In order to further reinforce the letter shape, the student should also name each letter aloud, thereby producing a firm connection between the sound and symbol through auditory as well as kinesthetic reinforcement. This simultaneous use of oral spelling with letter formation is said to be one of the surest ways to prevent slips between the brain and hand in the dyslexic child. The author also urges that cursive rather than manuscript writing be used for dyslexic children because its use tends to eliminate letter reversal (e.g., b and d); because the cursive word is treated as a unit; and because the continuous line of cursive script prevents realignment problems usually associated with the discrete letter shapes of manuscript writing.

89. Lahey, Benjamin B.; Busemeyer, Mary Kay; O'Hara, Christiane; and Beggs, Vicki E. "Treatment of Severe Perceptual-Motor Disorders in Children Diagnosed as Learning Disabled." *Behaviour Modification*, January 1977: 123-140.

This study was designed to test the effectiveness of behavior modification techniques (using positive reinforcement) on the improvement of handwriting in children with severe perceptual-motor disturbances. The sample for the study consisted of four male subjects (two black and two white) having similar diagnoses of serious and pervasive perceptual problems. The two black students attended the same public elementary school in South Carolina while the two white students, with more severe problems, were enrolled at the Georgia Retardation Centre. During the baseline period, copying sessions were held but no feedback or reinforcement of any kind was given. During the treatment phase all conditions remained the same except that subjects were given 'right' or 'wrong' feedback, plus a token for each correct copying response. At the end of the session, tokens were traded for pennies, which the subjects were allowed to keep. It was found that the performance of all students was basically stable in the baseline period; however, after the introduction of reinforcement and corrective feedback, the number of correct copying responses increased. These findings

suggested to the authors that even severe perceptual-motor disorders in handwriting can be effectively remediated using direct instructional methods and positive reinforcement strategies.

90. Levine, Norman, and Carter, Joan. "Handwriting for the Learning Disabled." *Academic Therapy Quarterly*, Fall 1968: 35-38.
The authors suggest that in order for letter formation to be mastered, basic handwriting movements must be thoroughly learned by the student. In order for the learning-disabled child to have a 'feel' for these basic shapes, the teacher should guide his hand during the initial writing exercises, thereby providing the proper kinesthetic feedback. Finger tracing, through the use of letters carved into wooden blocks, is also recommended for this purpose. As the child advances through the handwriting program, fewer and fewer visual and kinesthetic cues should be given so that the student is required to rely on internalized (visual and kinesthetic) information about the letter shapes. For example, green and red dots, showing the starting and stopping points for individual letters may be employed just before all cues are abandoned.

91. Mullins, June; Joseph, Florence; Turner, Caroline; Zawadzski, Robert; and Saltzman, Larry. "A Handwriting Model for Children with Learning Disabilities." *Journal of Learning Disabilities*, May 1972: 306-311.
Describes a rationale for the systematic development of a cursive handwriting script for children with learning disabilities, and presents a 'model script' which has been designed and modified through the collaboration of educators, teachers, an optometrist, a graphic artist, and an occupational therapist. The model script is basically a form of joined manuscript writing, using upper case print capitals and joined lower case print letter forms. Such a style is seen to be advantageous for learning-disabled children because the connected letters cause words to be perceived as units, because the letter shapes are simple to create and hence easy to learn, and because the slant gives a sense of directionality.

92. McKenna, Alice Russell. "Some Notes on the Teaching of Handwriting." *Academic Therapy Quarterly*, Summer, 1966: 190-196; 229.
"A review of some teaching methods and practice techniques useful for both the remedial and classroom teacher. The article includes suggestions for exercises to develop visual-motor skills; materials;

varied alphabet forms; progressive writing practices; and the development of good work habits.

93. Otto, Wayne, and McMenemy, R.A. *Corrective and Remedial Teaching: Principles and Practices.* U.S.A.: Houghton Mifflin Co., Boston, Mass., 1966.
One chapter deals with handwriting practices, research concerns, and the diagnosis and treatment of handwriting problems. The authors indicate that problems in handwriting result from either (1) factors inherent in the writer himself, or (2) from the inadequacies of the instructional program; and that remedial teaching is required when legibility and/or speed are below standard. Causes for substandard writing typically include left-handedness, inefficiencies in muscular and perceptual functioning, extreme nervousness and emotional problems. The aim of remedial teaching is to overcome such problems and to help the student become independent in evaluating and improving his own handwriting style.

94. Prefontaine, Harris L. "Stress Reduction and Handwriting." *Academic Therapy Quarterly*, Fall 1968: 31-33.
The author comments on proper body posture for handwriting exercise for dyslexic children.

95. Reitan, Ralph M. "Complex Motor Functions of the Preferred and Non-Preferred Hands in Brain-Damaged and Normal Children." *Perceptual & Motor Skills*, October 1971: 671-675.
"A previous study of early school-age children indicated that a brain-damaged group took more time in normal name-writing than did a group of normal children with both the preferred and non-preferred hand. In addition, the difference between the two hands was greater for the brain-damaged children. These results could have been attributed, at least in part, considering the age range of six to eight years, to lack of development of skill in name writing. Therefore, the study was replicated using children in the nine to 14-year age range since name-writing should have been a practiced and perhaps over-learned skill for older children. Groups were formed by matching pairs of brain-damaged and normal children for race, sex and age. The results, found by applying converted scores derived from the study of younger children, confirmed the findings with younger children and permitted differentiation of the brain-

damaged and normal groups with almost the same degree of accuracy achieved in the prior study. The results suggest that the findings are not due to the lack of development of name-writing skill but instead reflect a difference in normal tempo, associated with brain damage, in a highly practiced, complex motor function."

96. Smith, Deborah Deutsch,and Lovitt, Thomas C. "The Educational Diagnosis and Remediation of Written b and d Reversal Problems." *Journal of Learning Disabilities*, June/July 1973: 356-363.
"This study reports the educational diagnosis, remediation, and follow-up of one child's writing reversal problem. By precisely examining the student's academic work, the experimenter discovered that his reversals were not pervasive but rather specific to two letters (b and d) in particular positions. Remediation teachers focused in the most frequent error: the initial d. Once this was corrected, there was no need to remediate written d in different positions or b in any position. In order to determine whether the learning of b and d carried over to other situations, two different conditions were presented to the child. Again, there was no need to remediate b or d. A post-hoc analysis of this boy's writing revealed that for the remaining eight months of school he maintained a high rate of corrections (90%) in writing b and d."

97. Stewart, Kathleen. "Two Approaches to Handwriting Instruction," *Slow Learning Child*, November 1973: 142-146.
The purpose of this study is to compare the relative effectiveness of a diagnostic remedial and a task analysis method of remedial handwriting in improving overall writing quality. (A diagnostic remedial program concentrates on the basic or underlying disabilities in perceptual, integrative, or expressive factors related to the handwriting skill, while the task analysis approach remediates only the specific handwriting tasks which the child needs to learn in order to write legibly, without any reference made to the underlying correlates.) Twenty-four students in grades four through eight, who required remedial work in handwriting, were randomly assigned to either the task analysis or diagnostic remedial groups and given thirteen thirty-minute sessions of handwriting instruction in representative versions of the appropriate teaching method. A criterion test for evaluating the form and slant of individual cursive letters was developed and administered to both groups, in

order to determine letter formation scores in both a pre-test and post-test situation. The scores on the criterion test were analyzed by means of a one-way analysis of covariance. Because the computed f-ratio for the analysis of covariance was significant at the 0.05 level, with the difference favoring the task analysis group, it was concluded that the representative task analysis approach was most beneficial in improving handwriting quality.

98. Truman, Ron. "Special Program for Aphasics Is So Successful Pupils Going to Regular Schools." Toronto: *Globe and Mail*, August 10, 1978. This article is concerned specifically with aphasic children: those who may not be able to read, write, understand speech, or even interpret pictures. The condition may be caused by an injury to the brain or be present at the time of birth. In order to teach communication skills to such children, all of the senses must be stimulated. In the case of handwriting skills, cursive script is used rather than printing because spacing between the letters is seen to cause greater confusion in the aphasic child. When the word is written, the sounds are seen to flow together without breaks, causing the word to be perceived as a unit. In addition to cursive script, color coding is used to emphasize different sounds through visual cues.

LITERATURE, REVIEWS, BIBLIOGRAPHIES, AND GENERAL SURVEYS OF HANDWRITING INSTRUCTION

Entries in this section provide an encapsulated view of current handwriting practices insofar as they include summaries of recent research findings, reviews of appropriate instructional techniques, and extensive bibliographic sources for more detailed information on specific areas of handwriting instruction.

99. Addy, Polly, and Wylie, Richard E. "The 'Right' Way to Write." *Childhood Education*, February 1973: 253-254.

Presents the results of a general survey on current handwriting instructional practices conducted by the Committee on Later Childhood Education of the Association for Childhood Education International, in which four aspects of handwriting instruction in ten scattered American states and the Canadian province of British Columbia were examined. The four handwriting areas considered are as follows: (1) the nature of handwriting (manuscipt vs. cursive); (2) the extent of instruction (number and duration of writing classes); (3) materials used; and (4) evaluation of the child's written product. Results showed that handwriting instruction was relatively uniform throughout the ten American states and British Columbia, with manuscript taught in Grades 1 and 2, and the transition to cursive made in Grade 3. Classes ranged from 11 to 20 minutes per day in duration. Sixty per cent of the teachers were found to use commercial instructional manuals, and 30 per cent employed student workbooks. Evaluation of the students' writing was done in about 70 per cent of the classes, but typically by the teacher himself, rather than on the basis of a standardized handwriting scale.

100. Askow, Eunice; Otto, Wayne; Askow, Warren. "A Decade of Research in Handwriting: Progress and Prospect." *Journal of Educational Research*, November 1970: 100-111.

An examination of educational research conducted during the decade from 1960 to 1970 in seven areas of handwriting analysis: letter formation, instructional techniques, body part positions, speed and stress, instructional sequence, writing instruments, and scales for evaluation. The authors point to some important findings in these studies and suggest areas requiring future research. Some of the conclusions they draw are as follows: (1) letter forms used in teaching handwriting to children should be as simple as possible, since simple geometric shapes are most easily remembered and later recognized; (2) tracing should be used extensively in writing readiness programs to coordinate visual and motor processes, because it provides more immediate visual cues than does copying on to a blank page; and (3) more individualized programs of instruction seem to promote higher levels of writing quality and may suggest that

strict adherence to commercial models, unaltered by teachers to meet individual childrens' unique needs, is undesirable.

101. Donoghue, Mildren R. *The Child and the English Language Arts.* U.S.A.: Wm. C. Brown Publishers, Fullerton, Calif., 1971.
One chapter of the text gives a general description of current handwriting instructional techniques and research findings. The author discusses ten aspects of writing readiness for the beginning writer, eight aspects of writing readiness for transition to cursive script, fourteen points stressing the merits of teaching typewriting to students in the upper elementary grades, and ten things to consider when teaching handwriting to left-handed students. In addition, fifteen of the most common errors in cursive handwriting are provided, including the failure to close letters (e.g., *a* like *u*, *d* like *cl*), the failure to loop letters that should be looped (e.g., *e* like *i*), the practice of looping letters that should not be looped (e.g., *i* like *e*, *t* like *l*), the formation of *m* and *n* like *w* and *u*, and the malformation of the letter *r* to look like *i* or *n*. According to a survey of one thousand sixth-grade students, problems with the letter *r* constitute twelve per cent of all illegibilities. The discussion provides an excellent review of handwriting theory and practice.

102. Herrick, Virgil E. *Comparison of Practices in Handwriting Advocated by Nineteen Commercial Systems of Handwriting Instruction.* U.S.A.: Committee on Research in Basic Skills, University of Wisconsin, Madison, Wisconsin. July 1960.
Nineteen American commercial systems of handwriting are compared in terms of the teacher guides to instruction and the actual texts which the students must follow. Although the comparative information is somewhat out of date, the discussion does suggest some important elements for any course of instruction in handwriting skills. These would include provision for writing readiness, muscular control and coordination, handedness, choice of cursive or manuscript style, optimal time periods for script instruction, writing instruments, models for evaluation, and so forth. It is suggested that objectives for any writing course should include a concern for speed, neatness, correct letter formation, letter size, uniformity, spacing of letters and words, and alignment of words and sentences. Writing is seen to be a motor skill, which is depen-

dent on the assimilation of proper visual, auditory, tactile, and kinesthetic-sensory images of the letter forms. Writing, therefore, is basically reproducing these mental images on paper, through the process of recall. Systematic formal instruction is deemed necessary to elicit handwriting as an automatic response to a mental flow of words and phrases.

103. Herrick, Virgil E. *Handwriting and Related Factors 1890-1960.* U.S.A.: School of Education, University of Wisconsin, Madison, Wisconsin. 1963.

A bibliography on handwriting covering the following areas: instructional materials; handwriting technique; courses of study; learning and developmental factors; style and letter forms; measurement and evaluation of handwriting quality; physiological aspects of the writing act; handedness; effects of ability and inborn traits; abnormal and unusual handwriting; aids to research; social and cultural factors; graphology; and historical development.

104. Herrick, Virgil E. (Ed.) *New Horizons for Research in Handwriting.* U.S.A.: University of Wisconsin Press, Madison, Wisconsin, 1963.

Report of the Invitational Conference on Research in Handwriting, held at the University of Wisconsin, October 1961. Here, handwriting is seen to be one of the most basic learning skills that a child must acquire, insofar as it has become a prerequisite for more advanced learning in every system of education existing at the present time. In an attempt to understand physiological and motor correlates of handwriting legibility, Harris and Rarick measured galvanic skin response, muscular tension, and force-variation ratio (i.e., change in writing pressure divided by time) under a variety of writing conditions (slow, fast, normal, best, etc.). Their data suggested that fast writing tended to maximize psychophysiological reactions in the child, while relaxed writing conditons tended to have the opposite effect. When the writing rate was slow, the variability in writing force was also low, and legibility was high; whereas, when the writing speed was fast, variability in force was high and legibility was low. It was concluded that there is an optimum range of writing speed for every individual, beyond which deterioration of muscular coordination and uneven writing pressure cause legibility to deteriorate. Smith and Murphy present a 'neurogeometric theory' of sensory feedback mechanisms which involves

the detection of spatial differences between the desired movements of the hand/arm as prescribed by the brain, and the actual hand/arm movements being carried out by the muscular control system. When such discrepancies between prescribed and perceived movements are detected, appropriate orders must be sent to the hand and arm muscles to correct this error in movement. Through a series of studies involving delayed visual feedback (accomplished with the use of closed circuit television equipment) the researchers concluded that instantaneous visual feedback of the writing act is essential for proper execution. Even repeated experience with delayed feedback tasks did not improve the writer's coping ability, and suggested that task repetition cannot compensate for immediate visual feedback. Harris and Herrick were concerned with the child's perception of the handwriting task and set out to determine whether children of different intelligence levels perceived handwriting in the same way. In general, they found that "bright" and "average" students were most capable of ranking writing samples according to quality, while the children in the "slow" group were the least capable of recognizing good handwriting samples. In addition, brighter students had a clearer perception of their own writing quality than did the slow students, who often overestimated their own writing ability. The authors suggest that more emphasis should be placed on having the child develop an awareness of proper writing models, than on repetitive drill exercises which might not promote critical awareness of letter forms. Finally, Templin attempted to study the manuscript and cursive handwriting of adults, in order to determine which style of writing remained more legible ten years after high school graduation. She found that females from all socio-economic status groups had higher writing legibility than did males, although males who wrote a great deal wrote more legibly than males who wrote less, while females who wrote more were less legible than females who wrote less. In addition, both males and females from an all-manuscript background (i.e., those who were not taught cursive), were the most legible group, while those who were initially taught manuscript and later switched to cursive at about grade three, were the least legible.

105. Horn, Thomas D. (Ed.) *Research on Handwriting and Spelling.* National Conference on Research in English, National Council of Teachers of English, Champaign, Illinois. 1966.
Three chapters in this book review then-current research in handwriting instruction for American schools.

106. Horton, Lowell. "The Second R: A Working Bibliography." *Elementary English*, April 1969: 426-430.
A short bibliography on handwriting broken down into the seven following categories: manuscript-cursive; the present state of handwriting; the relationship of handwriting to other subject areas; the left-handed writer; evaluation and quality; diagnosis and analysis of problems; and recommendations for teachers.

107. Huitt, Ray. "Handwriting: The State of the Craft." *Childhood Education*, January 1972: 219-223.
Looks at then-current research findings in the following handwriting areas: basic objectives, manuscript vs. cursive debate, optimal time for transition from manuscript to cursive, handedness, diagnosing difficulties in visual-motor coordination, evaluating legibility, speed and handwriting quality, and possible areas for future research.

108. Otto, Wayne, and Anderson, Dan W. "Handwriting." *Encyclopedia of Educational Research*, The MacMillan Company, 1969: 570-579.
Reviews major publications concerned with the history, teaching, art, and evaluation of handwriting; and gives an indication of the current state of the art in 1969.

MISCELLANEOUS

The entries in this final section cover a wide range of handwriting topics not contained in previous sections of the bibliography. Because of the limited number of materials concerned with classroom calligraphy, graphology, sex-typing, covert oral response, and other minor topics, they are grouped together here under the general miscellaneous heading.

109. Ebsen, Alf K. "Handwriting Aesthetics." *Manitoba Teacher*, June 1970.
Advocates the teaching of artistic handwriting or calligraphy as a means of promoting student interest in handwriting. Because of the artistic nature of the task, the author claims that students are more highly motivated to achieve proper letter form, neatness, and accuracy than in traditional repetitive drill exercises.

110. Groff, Patrick. "Can Pupils Read What Teachers Write?" *Elementary School Journal*, October 1975: 32-39.
The article surveys research on handwriting instruction and the legibility of print script and reaches three conclusions: (1) teachers' handwriting is less legible today than it was in the past, primarily because of a lack of programs designed to teach teachers how to teach handwriting; (2) manuscript writing should replace cursive as the style used by teachers because it is more legible; and (3) when using manuscript teachers should concentrate on letter size and case, line length and spacing, since these factors are thought to be important determinants of legibility.

111. International Business Machines Corporation. "Experimental Signature Verification System Detects Forgeries." Press release. U.S.A.: Yorktown Heights, New York, September 26, 1978.
Describes a signature verification system, invented by IBM's research division, which can detect differences between genuine and forged signatures by comparing the writer's pen acceleration (i.e., change in speed and direction) and pressure with a reference signature contained in the computer. Because handwriting patterns become habitual, the timing and style of writing are beyond the individual's deliberate control. The signature verification system measures handwriting movement with a great deal of accuracy and hence can detect minor differences that would result if one attempted to duplicate another's signature.

112. Lippa, Richard. "Androgyny, Sex-Typing, and the Perception of Masculinity-Femininity in Handwriting." *Journal of Research in Personality*, March 1977: 21-37.
Describes a preliminary study which hypothesized that strongly sex-typed persons actively monitor their behavior on the dimension of masculinity-femininity more than do androgynous persons,

whose personalities comprise both male and female characteristics. To test the hypothesis, handwriting samples created by feminine males, masculine males, feminine females, masculine females, androgynous males and androgynous females were given to a sample of undergraduate psychology students whose personalities were similarly ranked using the Bem Sex Role Inventory. A seven-point rating scale was used to rate the handwriting samples on their perceived degree of masculinity-feminity (1 = masculine; 4 = neutral; and 7 = feminine). Using a one-way analysis of variance to differentiate among the subjects, it was found that androgynous subjects did indeed differentiate less strongly along the dimensions of masculinity-femininity than did strongly sex-typed subjects ($p > 0.01$). Thus masculine males, feminine males, masculine females and feminine females all seem to have high sensitivity to masculine-feminine cues in handwriting, while androgynous males and females tend to be less sensitive to male and female styles of writing. The authors suggest that more research is needed here before any conclusive statement can be made about one's sex-typing and perception of masculinity-femininity in handwriting style.

113. McGuigan, F.J. "Covert Oral Behavior as a Function of Quality of Handwriting." *American Journal of Psychology*, September 1970: 377-388.

There is considerable evidence that subjects make covert oral responses (e.g., electrical activity in the tongue, lips and chin) when engaged in a variety of language tasks. It has been found, for example, that poor readers have a higher level of covert oral behavior during silent reading than do good readers. In this study, the author wished to see if covert oral responses also increased during the handwriting task, and if such responses were of greater intensity for those individuals with poor handwriting skills. The results of two detailed studies are reported in the article, both of which indicated that the amplitude of covert oral responses was significantly increased during writing tasks but not during non-linguistic tasks, such as drawing geometric shapes. In addition, the amplitude of the covert oral behavior during the writing tasks varied inversely with the quality of the person's handwriting. The role that such covert behaviour plays in linguistic performance is

uncertain. Some claim that it inhibits proficiency in the poor writers/readers; others feel that it is necessary for these individuals in order to achieve the level of proficiency that they have already reached.

114. Paine, M.J. "Blackboard Practice for Teachers in Training." *English Language Teaching Journal*, April 1974: 232-240.
Deals with practice techniques for the use of chalkboards by teachers in training. It is argued that 'weakness in all other teaching techniques, e.g., oral drilling, question-and-answer work, control, and even the ability to give clear and concise instructions in the vernacular, are reflected in the teacher's ability to use the blackboard.' Because of this notion, chalkboard practice exercises for student teachers are given in letter form, spacing, slope, and simple drawing techniques in order to improve their abilities to communicate effectively through handwriting.

115. Smith, Karl U., and Schappe, Robert. "Feedback Analysis of the Movement Mechanisms of Handwriting." *Journal of Experimental Education*, Summer, 1970: 61-68.
"To extend the feedback analysis of legibility in handwriting, a coordinate force transducer has been devised that makes possible the separate sensing of the right-left and near-far directions of writing motions and the converting of these movements to their electrical analogs. This method of transducing handwriting motions made possible systematic measurement of the effects of feedback displacement and delay of the visual feedback of writing movements and of analyzing the types of variation in legibility related to various feedback factors. Results showed that differential directional defects and general disturbances in legibility and timing of writing movements occurred in relation to both visual feedback displacement and delay of writing motions. The findings give added support to the view that writing is not a form of discrete stimulus-response behavior or stimulus tracking, but consists of self-generated forms of response comparable to steering, in which accuracy, legibility and learning are directly determined by feedback time factors and directional specificity of particular right-left and near-far coordinates of movement that dynamically control and project visual input in the writing act."

116. Tenaglia, Richard. "Graphotherapy: Aiding Children's Personality Development." *Elementary English*, May 1973: 775-779.
The author (a certified graphologist) claims that handwriting is not merely the result of a mechanical conditioning process, wherein letter symbols are internalized, but also 'a complex psychomotor manifestation of the mental movements within the individual's mind.' In other words, the writing style of an individual not only reflects psychomotor skill, but is also a form of behavioral psychofeedback, which gives clues about the psychological make-up of that individual. After reviewing several articles on graphology to support its credibility, the author questions why such an approach has not been used in educational settings to diagnose children's problems. Since writing style reflects certain behaviorisms in the individual, he also questions what specific behaviors are contained in the handwriting models that we encourage children to imitate in school. Several examples are given of undesirable character traits that are encouraged in handwriting models and also positive character traits, inherent in some individuals' writing, which are discouraged. Finally, he questions what happens to children emotionally when they are abruptly switched from vertical manuscript to right-slant cursive during the transition period.

117. Vandervoort, Paul. "Calligraphy in the Curriculum." *School Arts*, December 1970: 34-36.
Describes an elective course in calligraphy offered by the Portland, Oregon school system, in which italic script is used to create handwriting that displays both beauty and individuality. The author suggests that students are highly motivated in this class and acquire good italic writing styles.

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